

How we eat

An Empirical Study of Human Food-Related Behaviour in Germany

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Summary

This research is about human food-related behaviour. The focus is on *how* people eat (as opposed to *what* people eat) against the background that eating is an everyday behaviour and is influenced by diverse factors. At the same time, it influences many areas of life.

However, this work is divided into two phases, as the first study phase provided the basis for study phase 2.

Aspects that influence the perception of a protein drink among community-dwelling older people were investigated in the first study phase. Due to a protein deficiency, people aged 75+ often suffer from sarcopenia, a disease that can lead to a loss of muscle mass, strength and function. This disease often leads to dependency on others in old age. In order to support independent living as long as possible, the project aimed to develop a protein-dense drink to support the prevention from sarcopenia among the target group. To test three different commercially available protein drinks three focus groups (n = 25) with people aged 75+ in Bavaria, Germany were conducted. The aim was to identify the aspects that a target group specific protein-dense drink must meet to be consumed by the target group. However, the focus groups only produced aspects that negatively influenced the perception of protein drinks and thus led to a general rejection of protein drinks by the participants. Aspects such as naturalness, freshness, locally grown ingredients and trust were of high relevance when it comes to purchase (healthy) food and influenced the perception of the protein drinks accordingly, since they did not comply with these criteria. In addition, the participants showed a distrust towards the modern food industry, its food products and basic nutritional recommendations. With direct regard to the tested protein drinks, the sensory and hedonic evaluation of the drinks turned out unconvincingly.

Study phase 2 of the thesis was dedicated to the complexity of the influencing aspects on food-related behaviour, which were underpinned by the results of the first study phase. Based on these results, the superordinate question arose as to how people integrate food and eating into their everyday lives and thereby engage with themselves and the environment. In order to do justice to the complexity of the question, it was decided to use qualitative methods of analysis, which place the subject itself at the centre of the investigation and thus offer the possibility to name and discuss the relevant factors from a subjective perspective. Human food-related behaviour, moreover, takes place predominantly unconsciously, yet it is one of the most common forms of human behaviour. The unconscious character of food-related behaviour must also be taken into account in order to do justice to the complexity of this topic. For this, a definition of food-related behaviour was needed that takes this complexity into account. Spiekermann's (2004) approach to *eating action* could meet this requirement, as it includes many different facets of food-related behaviour.

Subsequently, the food-related behaviour was investigated by conducting problem-centred interviews with 37 participants. The data obtained was recorded and transcribed verbatim. The transcripts were the foundation for a content structuring qualitative analysis, which was followed by a type-building qualitative content analysis. The result was the building of seven *eating action types*, named: *Eating as a way of life*, *The Relaxed*, *Eating as self-determination*, *Eating as a necessary Evil*, *The Adaptive*, *The Overstrained* and *The Controlled*. They all show ways of developing and expressing the personality and the associated socialisation.

During the second step of study phase 2, the unconscious as an important influencing food-related behaviour was investigated. For that purpose, the implicit motives of each individual were

recorded by applying the Operant-Multi-Motive-Test (OMT). Then, the *eating action types* were put into relation with the results of the OMT to analyse the way the unconscious affects food-related behaviour. However, the results did not meet the scientific expectations of unambiguity of the research team. However, for *The Controlled* the result was clear: Here, the power motive is the dominant one, showing a clear relationship to the way people behave by way of control towards food and eating. Trends could also be identified for the other eating action types.

The last step of study phase 2 focused on the unique characteristic(s) of the individual *eating action types* in order to distinguish the types more strongly from each other and to show the differences regarding the integration of eating into everyday life. Furthermore, this step can be understood as the first step towards a generalisation of the built typology. For this purpose, a mixed-methods approach was used, which was divided into a quantitative content analysis, a cross-tabulation and a selective biserial correlation. The results highlighted, among other things, subjectivization, self-determination, the body as an instrument of power, adaptation, and overstraining in eating as important functions.

By taking into account the most diverse aspects of food-related behaviour, analysing it in depth and at the same time doing justice to its complexity, this research made a significant contribution to the study of food-related behaviour.

Zusammenfassung

Diese Forschungsarbeit befasst sich mit dem menschlichen Essverhalten. Der Fokus liegt auf der Frage, *wie* Menschen essen (im Gegensatz zu dem, *was* Menschen essen), vor dem Hintergrund, dass essen ein sehr alltägliches Verhalten ist und von verschiedenen Faktoren beeinflusst wird. Gleichzeitig beeinflusst es viele Bereiche des Lebens.

Diese Arbeit ist in zwei Phasen unterteilt, da die erste Studienphase die Grundlage für die zweite Studienphase bildete.

In der ersten Studienphase wurden Aspekte untersucht, die die Wahrnehmung eines Proteingetränks bei in der Gemeinschaft lebenden älteren Menschen beeinflussen. Aufgrund eines Proteinmangels leiden Menschen im Alter von 75+ häufig an Sarkopenie, einer Krankheit, die zu einem Verlust von Muskelmasse, Kraft und Funktion führen kann. Diese Krankheit führt im Alter oft zur Abhängigkeit von anderen. Um ein möglichst langes selbständiges Leben zu unterstützen, war es das Ziel des Projekts, ein proteinreiches Getränk zu entwickeln, das die Prävention von Sarkopenie bei der Zielgruppe unterstützt. Um drei verschiedene kommerziell erhältliche Proteingetränke zu testen, wurden drei Fokusgruppen (n = 25) mit Personen im Alter von 75+ in Bayern, Deutschland, durchgeführt. Ziel war es, die Aspekte zu identifizieren, die ein zielgruppenspezifisches proteinhaltiges Getränk erfüllen muss, um von der Zielgruppe konsumiert zu werden. Die Fokusgruppen ergaben jedoch nur Aspekte, die die Wahrnehmung von Proteingetränken negativ beeinflussten und somit zu einer generellen Ablehnung von Proteingetränken durch die Teilnehmenden führten. Aspekte wie Natürlichkeit, Frische, lokal angebaute Zutaten und Vertrauen hatten eine hohe Relevanz beim Kauf von (gesunden) Lebensmitteln und beeinflussten dementsprechend die Wahrnehmung der Proteingetränke, da sie diese Kriterien nicht erfüllten. Darüber hinaus zeigten die Teilnehmenden ein Misstrauen gegenüber der modernen Lebensmittelindustrie, ihren Produkten und grundlegenden Ernährungsempfehlungen. Zudem fiel die sensorische und hedonische Bewertung der Getränke im direkten Bezug auf die getesteten Proteingetränke nicht überzeugend aus.

Die zweite Studienphase der Arbeit widmete sich der Komplexität der einflussnehmenden Aspekte auf das Essverhalten, die durch die Ergebnisse der ersten Studienphase hervorgehoben wurden. Ausgehend von diesen Ergebnissen ergab sich die übergeordnete Frage, wie Menschen Lebensmittel und Essen in ihren Alltag integrieren und sich dabei mit sich selbst und der Umwelt auseinandersetzen. Um der Komplexität der Fragestellung gerecht zu werden, wurde sich für den Einsatz qualitativer Analysemethoden entschieden, die das Subjekt selbst in den Mittelpunkt der Untersuchung stellen und damit die Möglichkeit bieten, die relevanten Faktoren aus einer subjektiven Perspektive zu benennen und zu diskutieren. Menschliches Essverhalten findet zudem überwiegend unbewusst statt, ist aber eine der häufigsten Formen menschlichen Verhaltens. Auch der unbewusste Charakter des Essverhaltens muss berücksichtigt werden, um der Komplexität des Themas gerecht zu werden. Hierfür wurde eine Definition des menschlichen Essverhaltens benötigt, die der Komplexität Rechnung trägt. Der Ansatz des Essverhaltens von Spiekermann (2004) konnte dieser Anforderung gerecht werden, da er viele verschiedene Facetten des lebensmittelbezogenen Verhaltens umfasst.

In der Folge wurde das Essverhalten mittels der Durchführung von problemzentrierten Interviews mit 37 Teilnehmern untersucht. Die gewonnenen Daten wurden aufgezeichnet und wortwörtlich transkribiert. Die Transkripte bildeten die Grundlage für eine inhaltsstrukturierende qualitative Analyse, der eine typenbildende qualitative Inhaltsanalyse folgte. Das Ergebnis war die Herausarbeitung von sieben *eating action types*, genannt: *Eating as a way of life*, *The Relaxed*, *Eating as self-*

determination, Eating as a necessary Evil, The Adaptive, The Overstrained and The Controlled. Sie alle zeigen Wege der Entwicklung und des Ausdrucks der Persönlichkeit und der damit verbundenen Sozialisation.

Im zweiten Schritt der zweiten Studienphase wurde das Unbewusste als wichtiger Einflussfaktor auf das Essverhalten untersucht. Dazu wurden die impliziten Motive jedes Einzelnen mit Hilfe des Operant-Multi-Motive-Tests (OMT) erfasst. Anschließend wurden die *eating action types* mit den Ergebnissen des OMT in Beziehung gesetzt, um zu analysieren, wie das Unbewusste das Essverhalten beeinflusst. Die Ergebnisse entsprachen jedoch nicht den wissenschaftlichen Erwartungen an Eindeutigkeit des Forschungsteams. Für *The Controlled* war das Ergebnis jedoch klar: Hier dominiert das Machtmotiv, das einen klaren Bezug zum Kontrollverhalten in Bezug auf Lebensmittel und Essen zeigt. Auch für die anderen *eating action types* ließen sich Tendenzen erkennen.

Der letzte Schritt der Studienphase 2 konzentrierte sich auf die einzigartige(n) Charakteristik(en) der einzelnen *eating action types*, um die Typen stärker voneinander abzugrenzen und die Unterschiede hinsichtlich der Integration des Essens in den Alltag aufzuzeigen. Weiterhin kann dieser Schritt als erster Schritt zu einer Verallgemeinerung der erstellten Typologie verstanden werden. Zu diesem Zweck wurde ein mixed-methods-Ansatz verwendet, der sich in eine quantitative Inhaltsanalyse, eine Kreuztabelle und eine punktbiseriale Korrelation gliederte. Die Ergebnisse hoben u. a. Subjektivierung, Selbstbestimmung, den Körper als Machtinstrument, Anpassung und Überforderung beim Essen als wichtige Funktionen hervor.

Indem sie die unterschiedlichsten Aspekte des Essverhaltens berücksichtigt, eingehend analysiert und gleichzeitig der Komplexität gerecht wird, leistet diese Untersuchung einen wichtigen Beitrag zur Erforschung des Essverhaltens.

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List of Abbreviations

BMBF	Bundesministerium für Bildung und Forschung <i>Federal Ministry of Education and Research</i>
BMEL	Bundesministerium für Ernährung und Landwirtschaft <i>Federal Ministry of Food and Agriculture</i>
BMI	Body Mass Index
BfR	Bundesinstitut für Risikobewertung <i>Federal Institute for Risk Assessment</i>
BMWi	Bundesministerium für Wirtschaft und Energie <i>Federal Ministry of Economics and Energy</i>
Destatis	Statistisches Bundesamt <i>Federal Statistical Office</i>
DGE	Deutsche Gesellschaft für Ernährung e.V. <i>German Society for Nutrition</i>
FG	Focus group
OMT	Operant Multi Motive Test
ONS	Oral nutritional supplement
PD	Protein drink
PH	Product handling
PRF	Personality Research Form
R&D	Research and Development
WHO	World Health Organization

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1 Introduction – study phase 1

This work deals with the food-related behaviour of people. However, before this work can be devoted to human food-related behaviour, the structural characteristics of the German food sector should be elaborated.

When dealing with malnutrition, it is inevitable to also point out the consequences of malnutrition. Nutrition, *'as the greatest controllable risk factor for disease and early death [...] is the focus of preventive measures'* (Assmann-Stiftung für Prävention, 2018). Nutrition is considered the main cause of obesity and cardiovascular diseases representing classical common diseases (BMBF, 2020) as well as for other diseases, such as type 2 diabetes and lipid metabolism disorder (Assmann-Stiftung für Prävention, 2018; BfR, 2020). Moreover, inadequate intake of certain essential nutrients, such as an insufficient intake of protein or dietary fibre, can also lead to nutritional deficiencies, which may have physical consequences (Brownlee, 2011; Deutz et al., 2014; Grundy et al., 2016; Kaczmarczyk, Miller, & Freund, 2012; Kendall, Esfahani, & Jenkins, 2010; Paddon-Jones et al., 2015). Therefore adequate consumption of these ingredients is considered a measure for preventing diseases in old age (Assmann-Stiftung für Prävention, 2020; Kendall et al., 2010).

In order to generate an understanding of the problem of malnutrition and the resulting consequences for individuals and society as a whole, first, a brief description is given on how the food landscape in Germany currently looks like. Subsequently, the food-related behaviour of the German population with regard to overconsumption and nutritional deficits is described and discussed. The current state of health of the German population is then discussed by addressing the illnesses caused by poor nutrition and the proportion of people suffering from these illnesses in Germany. Afterwards, an existing measure to address the current state of public health is explained as well as the difficulties related to it. Based on the described literature results, the objective of this study is presented.

Food landscape in Germany

In order to understand the extent to which German society is confronted with food products on a daily basis, this section emphasises the importance of the German food sector as well as the quantity of groceries being available in Germany.

The food sector is one of the most important industry branches in Germany. In particular, the meat and meat processing industry, the dairy industry, the confectionery and bakery industry and the production of alcoholic beverages are the most important sectors (BMW, 2020). German grocery shops today offer a very wide range of products. In 2016, for example, German consumers could choose from an average of 1755 different food items in a food discounter (Ahrens, 2020), with larger supermarkets even offering over 15.000 food items (Destatis, 2017).

The food sector in particular is blamed for the emerging diseases, as people lack information about the food they buy (Klotter, 2015). Cheap food, which are also at very low prices compared to other European Union (EU) countries (Hofmann, 2016), is available day and night, since the main interests of the food companies are targeted at profit marketing and not at promoting health-supporting food products (Heindl, 2007). These characteristic factors of the German food sector can contribute to an unhealthy diet, which is discussed in more detail below.

Food-related behaviour – too much of / too little of

The abundance of food and unhindered access is one of the reasons for possible malnutrition. The consequences are serious, leading to well-known, widespread diseases. In most cases it is a question of 'too much' consumption. However, also a 'too little' of certain important ingredients can lead to physical deficiency symptoms.

Overall, average meat consumption in Germany is too high, as there is a correlation between the amount of average consumption of red meat and body weight. Although stable in recent years, the meat consumption at a level of 60 kg per capita/year is considered too high (DGE, 2017).

The per capita consumption of fruit is currently 73.6 kg (BMEL, 2020). The overall consumption of cereal products is increasing, which is initially positive, as cereal fibres reduce the risk of diabetes mellitus. In fact, however, there is a lack of adequate dietary fibre consumption in the German population. The recommended amount of 30 g per day is not met by 75% of women and 68% of men (DGE, 2012), although an sufficient consumption volume of dietary fibre can prevent the development of obesity, diabetes mellitus type 2, high blood pressure, heart disease, lipometabolic disorders and colon cancer (DGE, 2019). The consumption of milk, dairy products and cheese is also increasing, possibly accompanied by increased energy intake. In contrast, less spreadable and vegetable fats are consumed. Although this reduces the overall fat consumption, it cannot be ruled out that this trend will result in unsaturated fatty acids being replaced by saturated ones. While the consumption of sugar confectionery is falling, the consumption of chocolate continues to increase (DGE, 2017).

Particularly, people that are older than 65 years do not meet the recommended daily protein consumption of 0.8-1.2 g/kg of body weight per day (Bauer et al., 2013; Fulgoni, 2008; Houston et al., 2008; Isanejad et al., 2016; Volpi et al., 2013), which can lead to sarcopenia (Houston et al., 2008), the age-related loss of muscle mass, muscle strength and function (Bauer & Diekmann, 2015; Cruz-Jentoft et al., 2010; Morley, Anker, & Haehling, 2014).

The described consumption pattern of the German population contributes to their general state of health: Nutrition is the reason for the occurrence of several widespread diseases. In the following, a brief description of the extent and distribution of these diseases, which are amongst others the consequences of people's eating habits, is given. First, cardiovascular diseases will be discussed, which can lead to other serious diseases, which will then discussed briefly one after the other.

Nutritional status of the German population

In 2017, 37% of the total 932,272 deaths in Germany were due to cardiovascular disease (Destatis, 2019). The most important controllable risk factors for cardiovascular diseases are conditions such as obesity, diabetes mellitus type 2, high blood pressure and lipid metabolism disorders, as well as harmful behaviour such as smoking, lack of exercise and unhealthy nutrition (Robert Koch-Institut, n.d.). However, the interaction of nutrition, exercise and genetic predisposition largely determines the development of overweight. Overweight and obesity are in turn closely related to the development of other diseases, such as diabetes mellitus type 2 and certain types of cancer, such as colon cancer (Mensink et al., 2013). About one in eight type of cancers in Germany involves the large intestine or rectum (Robert Koch-Institut, 2016). In 2016, about 25.990 women and 32.300 men were diagnosed with this type of cancer and in 2017, 11.214 women and 13.102 men died of colon cancer (Radtke, 2020a). Also in 2017, 62.1% of men and 43.1% of women in Germany older than 18 years were overweight, of which 18.1% of men and 14.6% of women were obese (Destatis, 2018). Furthermore, the general prevalence of high blood pressure in 2015 in Germany was at 19.9% (Radtke, 2020b). The prevalence of known diabetes in the 18 to 79-year-old population in Germany in 2010

was estimated 7.2% and the prevalence of undiagnosed diabetes at 2.0% (Robert Koch-Institut, 2019). Type 2 diabetes represents the largest contribution: While 6.9 million people were still affected by it in 2015, it is predicted to increase to around 8.3 million in 2040. The known main risk factors for type 2 diabetes are obesity, lack of exercise and an unhealthy diet (Tönnies et al., 2019). Finally, the total 12-month prevalence of lipid metabolism disorder, which can be caused by overweight and obesity, was 20.5% in 2010 (Robert Koch-Institut, 2012).

Additionally, it is estimated that on average between 5 to 13% of the 60 to 70 year-olds are affected by sarcopenia, with the number rising to 11 to 50% for those over 80. This number is not restricted to Germany, but applies worldwide (Haehling, Morley, & Anker, 2010).

Measures in Germany to improve the nutritional status of the population

The described prevalence of overweight and diet-related diseases raises the question of what strategies are being pursued to improve the nutritional status of the German population. In the following, the strategy of 'Research and Development' (R&D) will be discussed, aimed at meeting the special needs of the German population in general or the specific target group of older people, respectively.

Research and Development (R&D)

One area of R&D activity of interest at this point is aimed at developing new products or modifying already known products. Generally, new products (and services) are the prerequisite for the success of companies (Reichwald, Engelmann, Meyer, & Walcher, 2007). This is because new products can take into account new trends, wishes and requirements of consumers. Societies are changing and with them the demands on (existing) products.

In Germany, R&D activities in the food industry are carried out in many different organizations (Menrad, 2004), for example internal R&D departments of industrial companies, private research institutes, and public research organisations (Menrad, 2004). Moreover, also universities and technical colleges carry out research projects with relevance for the food industry.

The problem with R&D

Co-operation between different stakeholders is seen as essential for the success of R&D activities of food companies. While interaction between the individual stakeholders is crucial, the system is not able to ensure adequate interaction between food companies, suppliers, consumers and research institutes (Menrad, 2004). Although the companies emphasise the high relevance of market issues and consumer needs, especially with regard to product innovations, Menrad (2004) emphasises that food companies in Germany show significant deficits in considering consumer needs. Due to the deficiencies of R&D in the food industry, new or improved nutritional products (Costa, Dekker, & Jongen, 2004) partially experience flop rates of 30 to 90%. Reichwald et al. (2007) confirm that these high flop rates can be attributed to unmet needs of the target groups of new products: *'The active integration of customers into the innovation process represents an approach that has so far only been practiced by very few companies to systematically identify market needs and thus avoid product flops. Especially the integration of customers in the early phases of the innovation process - i.e. the phases of idea generation and idea evaluation - is proving to be very promising, since all further development steps [...] are based on this.'* (Reichwald et al., 2007). Therefore, consumers should be involved in product development or modification at an early stage, thus enabling a transfer of knowledge that goes beyond the usual market research and its achievable possibilities (Reichwald et al., 2007; van Kleef, van Trijp, & Luning, 2005). In order to introduce new or modified products successfully, a phase model should be considered, which is typically described in literature, while putting

emphasis on the fact that the phases run iteratively (Reichwald et al., 2007). A common phase model consists of five steps: (1) idea generation and idea evaluation, (2) concept creation, (3) development, (4) prototyping and (5) market introduction (Reichwald et al., 2007).

1.1 Theoretical study model & research aim – exemplary with old people

As shown in the previous chapters, not enough is being done to successfully address the food-related behaviour of Germans. R&D as one type of possible intervention measure was exemplary pointed out. However, this measure comes along with difficulties and thus misses its aim of improving the health status of the population. In addition, there are different targets for different age groups, as the illness pattern can vary greatly. For example, older people suffer more often from sarcopenia (Assmann-Stiftung für Prävention, 2020), a problem that does not necessarily affect younger people. However, in turn younger people are affected earlier and earlier by overweight and obesity (Mensink et al., 2013). It is therefore not possible to implement only one concept, which is intended to have an impact on the society as a whole. Rather, target group-specific measures must be implemented.

To change people's eating habits, it is possible to launch new products on the market that counteract certain negative health trends and thus improve the health status of a specific target group. However, it is of increasingly importance to consider the needs of the target group during the development process of such a product. This is done by actively involving the target group in the process of identifying and evaluating new product ideas. In order to meet the demands of a target group, it was decided to work with a single target group in this thesis. The choice aims at older people (>65). As the average life expectancy rises in Germany, the goal of an independent life that lasts as long as possible is becoming decisive. After all, in an ageing population, maintaining physical function and mobility as well as enabling an independent life for people over 65 is of great importance for the people themselves, the state and the health insurance companies (Bauer et al., 2013; WHO, 2002).

A major health problem in the older generation is sarcopenia, which can be prevented by a sufficient protein intake. However, the reasons given in the literature for low protein consumption in old age are dental disabilities, a reduction in chemosensory and physical abilities, and changes in life situation, such as being widowed (Best & Appleton, 2013). According to recent literature, only 72% of older people cook (BMEL, 2017). Moreover, Tieland, Borgonjen-Van den Berg, van Loon, and Groot (2015) concluded that drinks are among the five most important sources of protein in snacks for older people. van der Zanden, van Kleef, Wijk, and van Trijp (2014) and van der Zanden, van Kleef, Wijk, and van Trijp (2015) found that dairy products are one of the best alternatives to protein-enriched foods for consumers aged 55 and older. In another study, this research group also showed that older people prefer to get their protein through traditional food products (van der Zanden et al., 2015), foods they already know and enjoy consuming.

Thus, due to the reasons of low protein consumption in old age, it was concluded that daily consumption of a ready-to-drink protein drink (PD) could be an option to increase protein intake in the elderly and thus support independent living. PDs do not need to be cooked or chewed, contain milk protein and as a drink can be part of a common dish. However, PDs that meet all these criteria and are designed to meet the needs of the target group are not available on the German food market yet. The existing high-PDs that contain the recommended minimum amount of protein are either offered in the form of an oral nutritional supplement (ONS) for malnourished patients or serve as dietary supplements for athletes.

The aim of this study was to lay the foundation for the development of such a PD. Accordingly, the aim was to investigate the criteria that a PD must meet in order to be consumed by the target group and thus counteract the likelihood of suffering from sarcopenia in old age. By involving the target group in R&D at an early stage, the study objective was to be achieved. Therefore, product handling should be carried out, followed by answering hedonic questionnaires and discussions about the PDs tested.

The research question and the structure of study phase 1 can be seen in Figure 1.

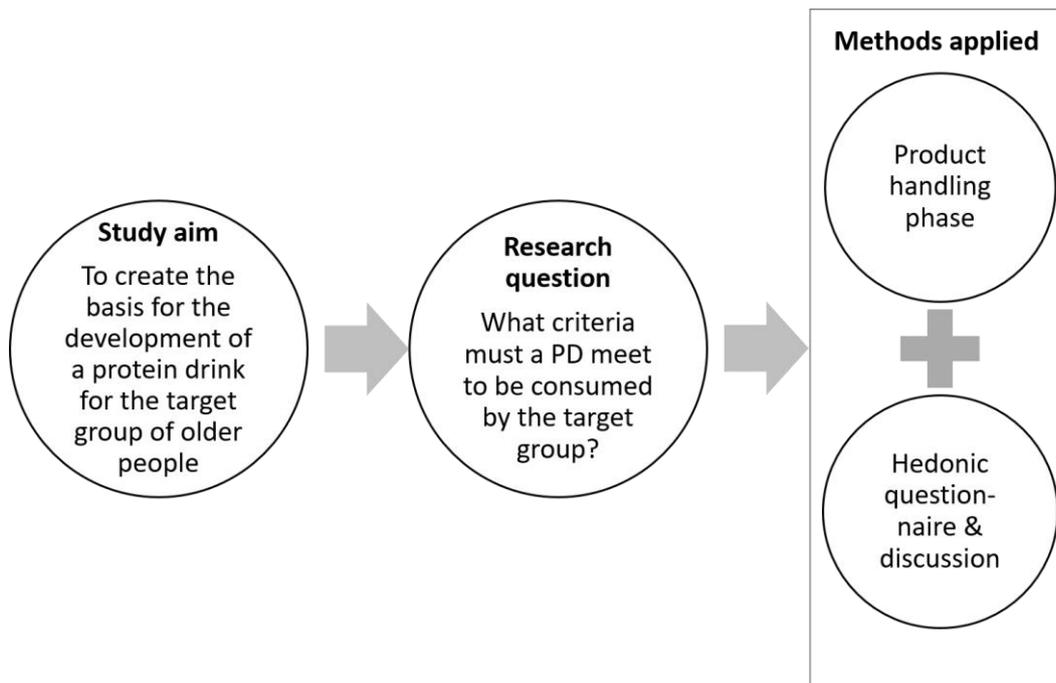


Figure 1 Research question and structure of study phase 1

In the following, the methodological procedure is described, including the method of data collection, the (selection of) participants, the material used and the data evaluation. Subsequently, the findings of the study and their implications are presented.

2 Methods

A qualitative study design was used to fulfil the purpose of the study. Qualitative empirical social research focuses on the human being and tries to understand the person holistically and to improve the person's situation. It represents an open research process, in such a way that the researcher's attitude towards the research object remains open throughout the course of the study and the subject of research itself is given as much scope as necessary (Mayring, 2016; Schumann, 2018). Given the background of the goal of product evaluation by the older generation, it was decided to conduct focus groups (FGs) with older people. Thus, not only the goal of product evaluation was met, but also the demand for an open approach, in which the target group and its evaluation was the focus of the research.

2.1 Procedure

In 2015 and 2016, three FGs (n = 25) were conducted. For all three FGs, a semi-structured interview guideline was applied (Brinkmann & Kvale, 2015). The design of the three FGs was similar: all individuals sat around a table and a facilitator was present who moderated the FGs. In addition, a member of the research team helped the facilitator with the organisation and supported the smooth running of the FGs. Another member of the research team was appointed as secretary for the recording of the FGs. The FGs lasted between two and two and a half hours without interruption. The FGs were audiotaped and transcribed verbatim. All individuals gave informed consent and participated voluntarily.

After the first FG was carried out, a slight modification of the semi-structured interview guideline was made to better fulfil the study aim. After the second FG, a further small change was made to the guideline. All three FGs ended with a 1-minute statement by each individual concerning their most important personal considerations for a newly developed PD, and, except of one person (n = 24), with the completion of the personal questionnaire.

2.2 Participants

In total, 25 independently living individuals from three different locations, namely from an assisted living facility, an old cohort and a gym, participated in FGs, aged 75+, who were all living in similar living conditions. The aim was to address mostly people in an age of 75 and older, as people of 75+ are generally more likely to experience a negative course of sarcopenia, so the need for prevention is most urgent in this age group. However, exceptions were made for participants aged 67, 68 and 74, which were accepted for the FGs.

FG1 was held in an assisted living home in the city of Straubing, Germany, where individuals lived independently and did their food shopping without assistance. Recruitment of participants was done by a staff member of the assisted living home, being the contact person. FG2 was conducted at the Institute for Biomedicine of Aging in Nuremberg, Germany. Here, the contact was made by the second author (AH) of paper I via an address list of individuals from previous studies. FG3 took place at a gym in Straubing. Here, the staff of the gym was responsible for the recruitment of the participants.

2.3 Materials

During the FGs different materials were used, which are briefly presented in this section.

2.3.1 Semi-structured interview guideline

The FGs started with a short introduction concerning the special need of protein consumption in old age, followed by a short round to get to know each other and a warm-up question. The FG1 continued with the product handling (PH) by testing three different conventional PDs (sports drinks and ONS), which were the same in all three FGs. Individuals were given 100 ml of each drink in a neutral plastic cup so that the PDs could not be identified. During the PH, people were asked not to talk to each other to avoid mutual interference. Following the PH, a discussion took place on the experiences centred on advantages and disadvantages of PDs and the individual wishes of the FG participants regarding a desired PD. Subsequently, the individuals filled out a questionnaire on hedonic perception for each PD. Afterwards, reasons for (non-)drinking the PDs were discussed.

After the introduction and the warm-up question, FG2 and FG3 (n = 18) continued with a discussion of the important criteria for buying food, the most important aspects influencing the choice of healthy food and the general understanding of health. These questions were asked to gain a general understanding of the food-related context, behaviour, interests and thinking of the individuals and to link this information to the perception of commercially available PDs. This section was followed by the PH. Subsequently, FG2 and FG3 were asked to discuss their experiences with PDs and the advantages and disadvantages of PDs. The next step, conducted only by FG2, consisted of a discussion on essential criteria that have to be met by PDs in order to convince the target group of their respective consumption. Then the hedonic questionnaire was filled out. FG3 continued the discussion about the general interest in dairy products, their wishes for an adequate communication about the special need for protein intake in old age and the question whether such a PD was desirable at all. For a better understanding of the impact of the change on the process of FGs, see Figure 2.

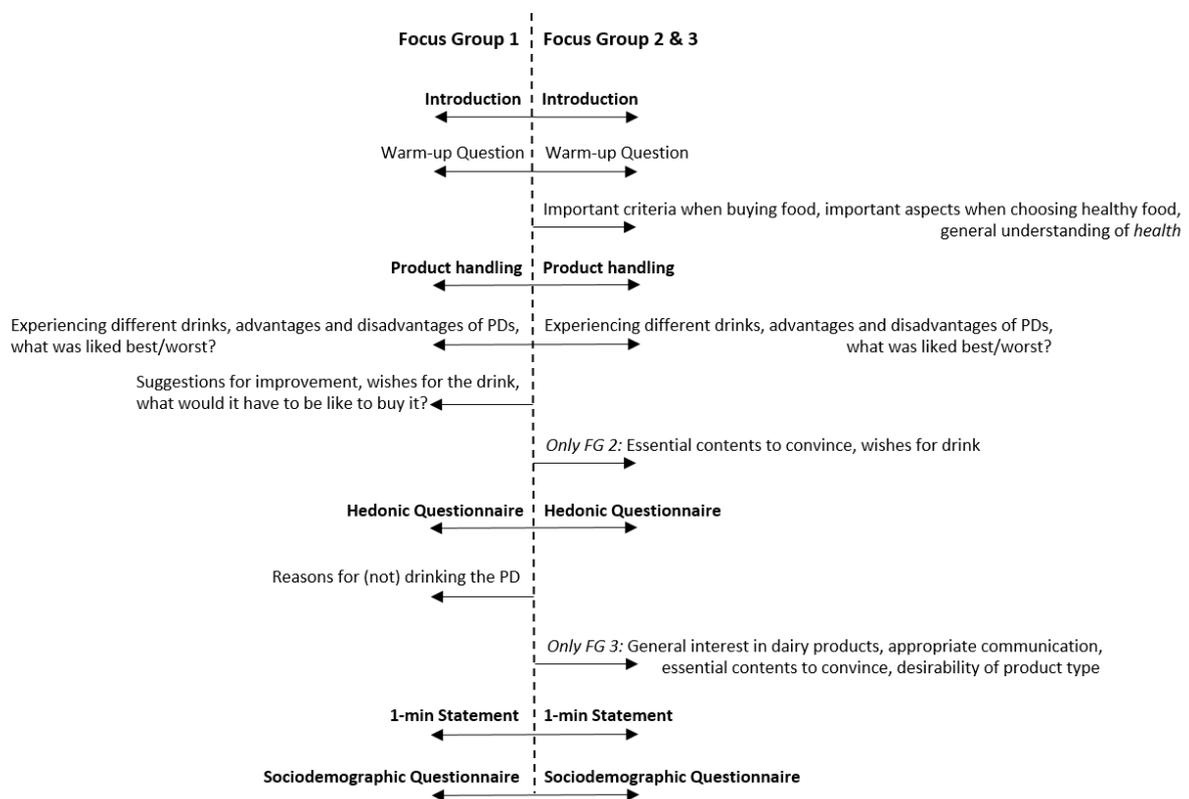


Figure 2 Impact of modification of FG guideline on FG process

2.3.2 Hedonic questionnaires

First, a hedonic questionnaire was applied for each PD per FG. The questionnaires served to assess the sensory aspects of the PDs and included questions about:

1. The overall liking of PD
2. The overall liking of flavour
3. The characterization of flavour
4. The perceived degree of sweetness
5. The intensity of flavour
6. The overall liking of consistency
7. The characterization of consistency
8. The conceivable portion size to be consumed
9. How much they would be willing to pay

A 5-point Likert scale was used to characterise taste and consistency. To characterise taste and consistency, participants were asked to choose one of seven possible options. For the characterisation of taste, the test persons were allowed to choose more than one of the 14 options offered, so this question fulfilled the criteria for a 'Check-all that-apply' (CATA) question. According to Ares and Jaeger (2013) and Ares et al. (2013), for this type of question it is useful to avoid an alphabetical order of attributes and to ask the subjects to first finish the PH and then fill in the hedonic questionnaire to get an overall impression of the different beverages.

2.3.3 Personal questionnaires

Furthermore, individuals had to fill out a personal questionnaire. The personal questionnaire implied questions as follows:

- | | |
|---|--|
| 1. Sociodemographic data | 4. The self-estimation of own health |
| 2. The interest in information about nutrition | 5. The self-estimation of own health compared to peers |
| 3. The self-estimated importance of a balanced nutrition for the health status in old age | |

A 4-point Likert scale was used for questions 2, 3 and 4. A 3-point Likert scale was used for question 5. With the exception of one person, all persons filled out this questionnaire.

2.3.4 Protein drinks

Since the FGs were already of long duration and the participants were not to be overburdened, no more than three conventional PDs were tested. Three selection criteria were defined to reveal the potential differences in the perception of PDs. The three selection criteria were:

- The implication of the recommended minimum amount of 8g protein per 100ml
- Similar flavour (fruity flavour)
- Compliance of product types with the main classes sport drink and ONS

The latter selection criterion was defined as sports drinks and ONS meet nutritional requirements, are commercially available and are of low volume. Finally, two sports drinks (PD A: raspberry and blueberry; PD C: strawberry) and one ONS (PD B: multifruit) were selected. Detailed information on the PDs can be found in Table 1.

Table 1 Nutrient composition of protein drinks

Nutrient composition	Protein Drink A per 100ml	Protein Drink B per 100ml	Protein Drink C per 100ml
Type of Drink	Sport Drink	ONS	Sport Drink
Flavour	Raspberry and Blueberry	Multifruit	Strawberry
Protein type	Whey protein concentrate or isolate	Milk protein	Skimmed milk concentrate
Energy	231 kJ / 55 kcal	630 kJ / 150 kcal	255 kJ / 61 kcal
Fat	0,7 g	6,7 g	0,1 g
- Saturated fat	0,5 g	0,6 g	0,1 g
Carbohydrates	4,1 g	12,4 g	4,9 g
- Sugars	3,5 g	7,1 g	4,8 g
Protein Content	8,0 g	10 g	10 g

2.4 Data analysis

For data analysis, a summarizing qualitative content analysis based on Mayring (2010) was applied after verbatim transcription of the material according to Dresing & Pehl, 2015, which represents a rule-based methodical procedure. In order to reveal and summarize central topics, the summarizing qualitative content analysis implied three subsequent steps, namely paraphrasing, generalization and reduction whereby the reduction process can be applied several times (Mayring, 2010), which was done twice in this study. The aim was to filter the actual consensus of the target group and reduce it to its essentials. Therefore, it was not the individual statement that was of interest, but it was a matter of summarizing the consensual opinion of the FGs about the perception of PDs and the aspects that influenced this perception.

Study phase 1 resulted in paper I (Figure 3), which is presented in the following section.

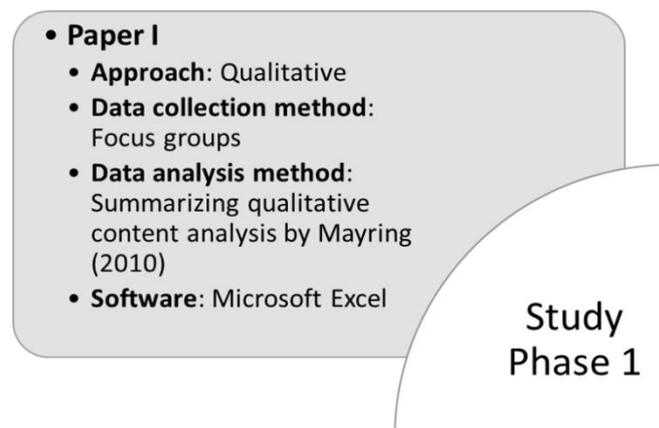


Figure 3 Overview of resulting paper I

3 Publication & results - study phase 1

This chapter deals with the results of the study. Therefore, the paper, which was prepared in connection with study phase 1, is presented. The approach, the method and the main results are described. It also shows how this study has contributed to current research on protein intake in old age.

3.1 Protein for Community-Dwelling Older People: Aspects That Influence the Perception of Commercially Available Protein Drinks

The article 'Protein for Community-Dwelling Older People: Aspects That Influence the Perception of Commercially Available Protein Drinks' was published in the open access Journal *Frontiers in Nutrition* in 2020. The doctoral student of this work was the first author of the article, conceived and designed the experiments, analysed the data and wrote the paper. The first and the last author carried out the experiments. The second, third and fifth authors provided information on the nutritional background of the project, selected the test drinks, contributed to the development of the questionnaires and designed parts of the introduction. All authors contributed to the article and approved the submitted version. The full citation of the article is as follows:

Publication I

Lampmann Lyn, Hannink Anne, Kiesswetter Eva, Emberger-Klein Agnes, Volkert Dorothee and Menrad Klaus (2020) Protein for Community-Dwelling Older People: Aspects That Influence the Perception of Commercially Available Protein Drinks. *Front. Nutr.* 7:100. Doi: 10.3389/fnut.2020.00100

Status: Published

The presentation of the results of the first study phase is the summary of the written publication.

In the course of their lives, older people (aged 65 and older) often have to give up their independent lifestyle due to illness. One of these illnesses is called sarcopenia, a disease that can cause loss of muscle mass, strength and function (Bauer & Diekmann, 2015; Cruz-Jentoft et al., 2010; Morley et al., 2014). However, a daily protein consumption of 0.8 g protein/kilogram of body weight could prevent sarcopenia and support an independent lifestyle (Houston et al., 2008). Nonetheless, many older people do not meet the recommended daily amount of protein consumption (Fulgoni, 2008; Houston et al., 2008; Isanejad et al., 2016).

Thus, the aim of this study, as part of the *Enable research cluster* that targeted to promote healthy food choices in all stages of life, was to develop a protein-rich product especially for the target group. Since launching of new (food) products on the (food) market often fails, it is highly recommended to involve target groups in new product development (NPD).

The study was designed to involve older, but still independently living people in the development process of a protein-rich product. Since older people also often suffer from chewing and swallowing difficulties and cooking is no longer one of their favourite activities, a PD was found to be appropriate to improve the protein household in old age, since it is drinkable and must not be cooked (Best & Appleton, 2013; Tieland et al., 2015). It was therefore decided to test PDs with the help of the target group to find out what older people consider important for such a drink to meet their specific wishes and ideas.

Since little was known about the perception of older people towards such a product, an explorative approach was applied, as it was important to get an idea of what could be important to the target group. Thus, it made sense to have an open conversation with the people without specifying possible answers. Therefore, three FGs with people aged 75+ (n = 25) were conducted (Kühn & Koschel, 2011). The FGs were audiotaped and transcribed verbatim. As analysis technique, a summarizing qualitative content analysis according to Mayring (2010) was applied.

In contrast to the assumptions of the involved scientists, only aspects that influenced the perception of the PDs by the target group negatively were found. Aspects such as naturalness, freshness,

locally grown ingredients and trust played an important role in the purchase of (healthy) food and were of outstanding importance for the general perception of food. However, the PDs tested could not meet these criteria. The sensory and hedonic evaluation of the drinks turned out accordingly. In addition, the participants showed a distrust of the modern food industry, its food products and basic nutritional recommendations. However, they trust their family doctor and people close to them.

Moreover, the participants were highly uninformed about their special need of protein consumption. Even the clarification at the beginning of the FGs could not convince participating people that they had an increased protein requirement. This fact once again highlighted the trust in the known and the mistrust in the unknown.

As older people did not see the need for proteins in advanced age, they did not see the need to consume special foods to counteract a possible nutritional deficit in this respect. As the results of the first FG suggest, the PDs primarily fails because of adequate information and communication about the needs of this particular age group and the implementation of essential criteria in PDs.

However, this was not the only reason: even regardless of the need for additional protein consumption and the fact that the drinks were not perceived as good products, they were felt to be unimplementable in everyday life of the participants. It was not clear whether it should replace snacks, a complete meal or just – as initially suggested – a drink within a meal.

Due to the results of this study, namely the sceptical attitudes in general towards the PDs due to certain important aspects with that the PDs do not comply, this paper contributed significantly to the understanding of the older generation when it comes to developing food products for their specific needs.

4 Introduction – study phase 2

The results of study phase 1 have made it clear that people's food-related behaviour is very complex and is apparently influenced by both individual perceptions and social values. Even though the participants of the first study phase were quite unanimous in their rejection, the resulting key criteria for rejection point to both individual (e.g. no need for supplementation, excessive demands on how to consume or use the product) and social (e.g. distrust of the modern food industry, its food products and basic nutritional recommendations) aspects. However, based on the results from the first study phase, this interaction did not yet provide a consistent picture. Rather, the question was raised of how people deal with food-related behaviour against the background of individual as well as social demands. Food is important for social relationships and communication and it can signal friendship, belonging and closeness (Feichtinger, 1998). In addition, it can indicate social status, power, hierarchy and exclusion and it expresses religious, ethical and moral beliefs. Moreover, food and eating can create self-esteem and emotional security, but also fear and guilt (Feichtinger, 1998). All individual and social areas that are influenced by eating underline the complexity of this topic.

Since the reasons for food-related behaviour seemed to be very complex and could not be covered by the focus on product evaluation, the focus of this study was shifted from the PDs and their evaluation to individuals and their food-related behaviour in a second phase. It analysed how people integrate food into their everyday lives as they engage with themselves and the environment, and why they do it the ways they do.

Complexity reduction of food-related behaviour

'Most people perform the act of eating several times a day, sometimes with little thought. Despite the almost taken-for-granted aspect of eating, there are complex factors underlying food consumption' (Williams & McMahon, 2019). The complexity arises from the interplay of individual and social factors that influence people's food-related behaviour (Brombach, 2011) and the fact that it is a very common human behaviour (Köster, 2009; Williams & McMahon, 2019) that can take place consciously as well as unconsciously (Köster, 2009; Murcott, 2000; Spiekermann, 2004; Wansink & Sobal, 2007; Warde, 2016). The last aspect will be discussed in more detail in the next section.

Klotter (2016) expresses the interplay of social as well as individual factors in relation to food. He summarises food as the 'language of cultural identity' and as the language of differentiation from social conditions. Accordingly, personality-forming processes cannot be considered in isolation from social conditions. Personality is a matter of external perception as it emerges through the interaction of individuals with their environment (Klotter, 2016). Thus, food can be actively used or rejected to represent certain personal values to the external world (Murcott, 2000).

One way to reduce complexity and to structure an area of investigation, such as food-related behaviour, is to build a typology. A typology is the result of a grouping process in which subjects or objects of a field of study are classified into similar types with regard to the previously defined characteristics (Kluge, 2000). Thus, by type-building (Diaz-Bone & Weischer, 2015; Kuckartz, 2014b; Silver, 2013) facts are sorted according to comparable characteristics (Wienold, 2013), with the aim of reducing the diversity of data to a few manageable and fruitful terms (Diaz-Bone & Weischer, 2015). This is intended to reduce the complexity of situational or personal constructs (Brusten, 2013).

For commercial consumer research, the building of nutritional types is a common procedure. The primary goal is to explain the demand for food. In Germany, various commercial market research institutes (Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Janke, 2009) have built different nutritional types. However, the exact methods used to build them are usually not disclosed. Nevertheless, market research institutes often apply multivariate statistical methods that examine consumers for their differences or similarities (Oltersdorf, 2019).

Furthermore, several (international) scientific studies have built nutritional typologies (Blake, Bell, Freedman, Colabianchi, & Liese, 2013; Bruhn, 2008; Brunsø, Grunert, & Bredahl, 1996; Kluß, 2018; Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011; Stieß & Hayn, 2005). Many of the scientific typologies focused on a specific thematic issue, such as sustainability (Stieß & Hayn, 2005), enjoyment (Kluß, 2018), healthy eating (Blake et al., 2013), sensory preferences (Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011) or obesity (Brunso et al., 1996). In addition, most studies used quantitative survey instruments (Blake et al., 2013; Bruhn, 2008; Brunsø et al., 1996; Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011; Stieß & Hayn, 2005) or combined qualitative and quantitative survey instruments (Stieß & Hayn, 2005).

In contrast to the above-mentioned commercial as well as academic nutrition types, however, special attention should be paid to food-related behaviour from the perspective of the individual, taking into account the multiple aspects that play a role in integrating food into everyday life as the individual engages with individual and social demands.

The role of the unconscious in eating

Even though Murcott (2000) emphasises the active element of food use, the unconscious also seems to have an influence on people's eating behaviour and needs to be examined more closely, as no

scientific methods have yet been developed to investigate either the concrete influence or the extent of this influence.

Köster (2009) and Wansink and Sobal (2007) claim that most of the food-related behaviour takes place unconsciously, although this fact hardly plays a role in food-related consumer and sensory studies. Köster (2009) stresses that: *'[...] findings about intuitive thinking and the clear demonstration of the unconscious nature of most of our decision-making processes do not seem to have touched sensory and consumer research, although they probably play a more important role in food-related behaviour than anywhere else'*. Due to the at least partially unconscious nature of food-related behaviour, asking people about the reasons for this particular behaviour encourages storytelling. As people are not aware of their unconscious principles, they tend to answer in terms of social desirability (Köster, 2009). According to Wilson (2002), people respond to such questions with narratives, which are partly invented based on what can be deduced from remembered past behaviour, but which are only conditionally related to their own behaviour. In addition, Köster (2003, 2009) makes similar arguments against the often used laddering method (Brunsø et al., 1996; Costa et al., 2004; Costa, Schoolmeester, Dekker, & Jongen, 2007; Grunert, Brunsø, Bisp, & Søren, 1993; Nielsen, Bech-Larsen, & Grunert, 1998), which is supposed to find out the motives of the people behind certain behaviour. He says that the sequence of 'why' questions does not make sense because people do not know the answers and therefore make up stories to answer them (Köster, 2003, 2009). Due to the difficulties accompanied with asking people directly about their personal attitudes concerning food-related behaviour, Mojet (2001) and Köster (2009) emphasise *'[...] that the implicit nature of food-related behavior requires [...] the development of more appropriate/adequate research methods that measure the motives of the consumer and his reactions to food in a more implicit way.'* (Köster, 2009). Baum (2011) finds it worthwhile to focus on motives and attitude structures in order to gain more clarity in this often-unconscious behaviour

In summary, both individual and social aspects play an essential role in human food-related behaviour. This makes eating a very complex topic and raised the question of which paths people take against this background to integrate eating into their everyday lives. In order to do justice to the complexity, a method was chosen that aims to reduce complexity and thus make the content more tangible: the method of type-building. At the same time, however, unconscious processes also play a significant role in eating, which also needed to be taken into account and which was analysed by implicit methods. The fact that both conscious and unconscious processes play a role in eating is not a contradiction. On the contrary, it underlines once again the complexity of eating on the one hand and the associated difficulty of making it tangible on the other. Therefore, it is important to consider both aspects, the conscious as well as the unconscious, when aiming at deepening the understanding of food-related behaviour.

4.1 Theoretical study model & research aim

The results of study phase 1 as well as the subsequent literature analysis have shown the need to investigate the different possibilities of integrating eating into everyday life from an individual perspective with regard to the unification of individual and social demands. Starting from the (alternating) effect of individual and social demands on the individual, the following investigation was based on the conception of the human being according to Hurrelmann and Bauer (2015), which is described in the 'Introduction to Socialisation Theory' ("Einführung in die Sozialisationstheorie"). Hurrelmann and Bauer (2015) understand personality development as a definitional component of socialisation

and describe it as a *'lifelong appropriation of and engagement with the natural endowments, especially the basic physical and psychological characteristics, which represent the "inner reality" for humans, and the social and physical environment, which represent the "outer reality" for humans'* (Hurrelmann & Bauer, 2015). Both realities are not created or invented, rather people have a methodical and epistemological access to inner and outer reality, whereby both realities are individually coloured. According to Hurrelmann and Bauer (2015), successful socialisation takes place when there is a successful assertion of subjectivity and identity after confrontation with social structures through participation (Abels & König, 2016; Hurrelmann & Bauer, 2015). Confrontation with inner and outer reality thus plays a decisive role in the development of personality.

Accordingly, for the first part of study phase 2, it was assumed that it made sense to let individuals report their coloured realities unhindered, without aiming for a specific answer, in order to get an unfiltered and authentic access to food-related behaviour, which consists of actively dealing with oneself and the environment. Spiekermann's (2004) conception of food-related behaviour corresponds to this understanding when he proposes the term *eating action* ("Esshandeln"), which he understands as a combination of interpretation and action processes of active and self-thinking people, taking into account the individuals' experiences and their independent rationality (Spiekermann, 2004). In order to get closer to these action (how people act) and interpretation (how they interpret their own behaviour) processes in eating, qualitative data collection through interviewing was chosen. The qualitative research paradigm advocates a humanistic view of human beings, in which people have free will and the need for self-actualisation (Rogers, 2020; Schumann, 2018). Moreover, it enabled individuals to set meaningful priorities in reporting on their own action and interpretation processes, because *'The qualitative research interview attempts to understand the world from the subjects' point of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations.'* (Brinkmann & Kvale, 2015) and thus brought the individually coloured realities onto the agenda.

Furthermore, unconscious processes also have an influence on people's food-related behaviour, although this has hardly been taken into account in studies (Köster, 2009) outside of practice theories. Moreover, even when the unconscious was acknowledged, it was not investigated by means of implicit methods. Accordingly, the second part of the second phase of the study aimed to investigate and analyse the influence of the unconscious on food-related behaviour in more detail. In connection with the unconscious, implicit motives are of essential importance. According to McClelland (1985), everyone's imagination is significantly influenced by the motives of affiliation, achievement and power, because they occupy a large space in everyone's mind. The more pronounced a motive is, the more it outweighs the others and the more it dominates a person's thinking, perception and experience. Accordingly, strong motives control human behaviour (Krug & Kuhl, 2006). Furthermore, Alsleben and Kuhl (2010) have discussed an extended form of the motive structure and introduced an additional motive, the motive of individual freedom, as a fourth motive (Alsleben & Kuhl, 2010). Figure 4 shows the meanings of the four implicit motives.

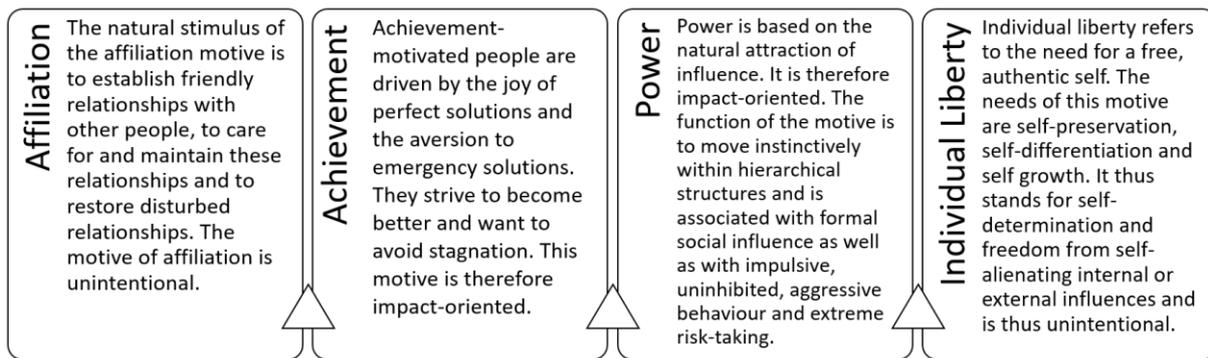


Figure 4 Meaning of the different implicit motives

Source: Alsleben and Kuhl (2010); Krug and Kuhl (2006); Kuhl (2013); McClelland (1975); McClelland (1985); Winter (1973)

Motives are understood as *'networks of experiences stored in images (not in terms), which a person has made in his life (especially in early childhood) in connection with the satisfaction of a need, i.e. which actions a person has tried out in which situations with what (satisfaction) success'* (Kuhl, 2013 - own translation). Needs are therefore the core of the respective motive that wants to be satisfied. Accordingly, motives form a portfolio of actions on how a need can be satisfied. Needs thus arise from the discrepancy between what is and what should be (Kuhl, 2001). They develop primarily from the confrontation with natural stimuli relevant to the motive, which become visible in family structures and their mechanisms. The development of implicit motives is closely linked to reactions to the conditions of socialisation, which vary from individual to individual due to their personality dispositions (Kuhl, 2013).

This understanding of motives incurs the assumption that perception and identification with a particular situation releases essential components of a personality, since *'people tend to interpret an ambiguous social situation in accordance with past experiences and current needs'* (Murray, 1943). Thus, when a person enters a situation that resembles a past situation in its motivational characteristics, the images experienced automatically appear, e.g., what the person did in that situation and how successful the action was. Therefore, motives have a special influence on the interpretation of a situation, as the situation is perceived by the individual as determining which need can be satisfied in which way in that situation. However, the images that appear are presented non-verbally and do not need to be consciously perceived. Therefore, these motives are described as implicit motives. Kuhl (2013) subsequently emphasises that *'Together, these four motivation systems form a basic motivational configuration that is common to all people, but is also based on different differences'* (own translation).

Even though the use of qualitative methods has been advocated above, especially for type-building, this should not be understood as a rejection of quantitative methods. On the contrary, both qualitative and quantitative research methods have their justification and their individual advantages that can be used and thus cross-fertilise each other (Creswell, 2015; Schumann, 2018). Therefore, it was decided to use a mixed-methods design for the analysis of the food-related types to be built first. The aim was to create an even better understanding of the different food-related types by focusing more on the differences that would be clarified by highlighting the unique characteristics of each type and to provide a first step towards generalising the built typology. The use of mixed methods involves collecting and integrating both qualitative and quantitative data to enable an analysis of the strengths of both approaches (Creswell, 2015). As a result, quantitative and qualitative data be-

come interdependent in the analysis of the research question (Bazeley, 2012) and the research becomes more than just the sum of the individual components (Fetters & Freshwater, 2015). The scope of the research question is thus broader and the findings more complete and comprehensive and with multiple perspectives (Kuckartz, 2014a).

Part 1

Accordingly, the first part of study phase 2 investigated how people integrate eating into their everyday life while they engage with themselves and their environment and thus experience personality development and the associated socialisation. The intention was to apply a content structuring qualitative analysis by Kuckartz (2016), which is the foundation for the use of a type-building qualitative content analysis (Kuckartz, 2016). The analysis was based on Spiekermann's (2004) understanding of eating to build different *eating action types*. Using this definition could deepen the understanding of people's everyday actions in relation to eating, as it allows to identify the differences and similarities in the way people integrate eating into everyday life (Prah & Setzwein, 1999) from the individuals' perspective. By building types, food-related behaviour with its complex interrelationships was reduced and simplified to a high degree and in an appropriate way, which increases its clarity (Kluge, 1999).

Part 2

In the second part of study phase 2, the influence of the unconscious on the previously built *eating action types* was examined. In order to capture unconscious structures, a projective psychological test, the Operant Multi Motive Test (OMT), was chosen, which provides information about a person's implicit motive structure. The aim was to analyse the influence of the unconscious on food-related behaviour by not asking direct questions about it. However, the analysis was an exploratory approach, a purely descriptive approach to the results, as the application of the OMT to the *eating action types* had not been realised before and accordingly a proven methodological procedure for such an analysis was lacking at the time of this study.

Part 3

Finally, the unique characteristics of each *eating action type* were stressed and tested for significance. To this end, quantitative analysis of qualitative data was applied. Representing a mixed-methods approach, it was implemented by using quantitative content analysis and cross-over analysis. Quantitative content analysis represents '*a research technique for the systematic, objective and quantitative description of the manifest content of communication*' (Berelson, 1952). The advantage of this method is to identify the broader themes that the individuals addressed during the interviews.

The cross-over analysis involved the transformation of qualitative to quantitative data. It is defined as the application of one analysis type to analyse the data of the other analysis type (Onwuegbuzie & Combs, 2010). Thus, it is an inter-paradigmatic analysis (Vogl, 2017). Cross-over analysis aims amongst others at complementarity (Greene, Caracelli, & Graham, 1989; Li, Marquart, & Zercher, 2000). Therefore, this research technique was implemented to complement findings about the seven *eating action types*. In order to obtain complementarity, the data was transformed (Caracelli & Greene, 1993) through quantification ("quantitizing") (Tashakkori & Teddlie, 2010).

Figure 5 shows the theoretical study design of study phase 2 and stresses the research questions underlying the respective steps.

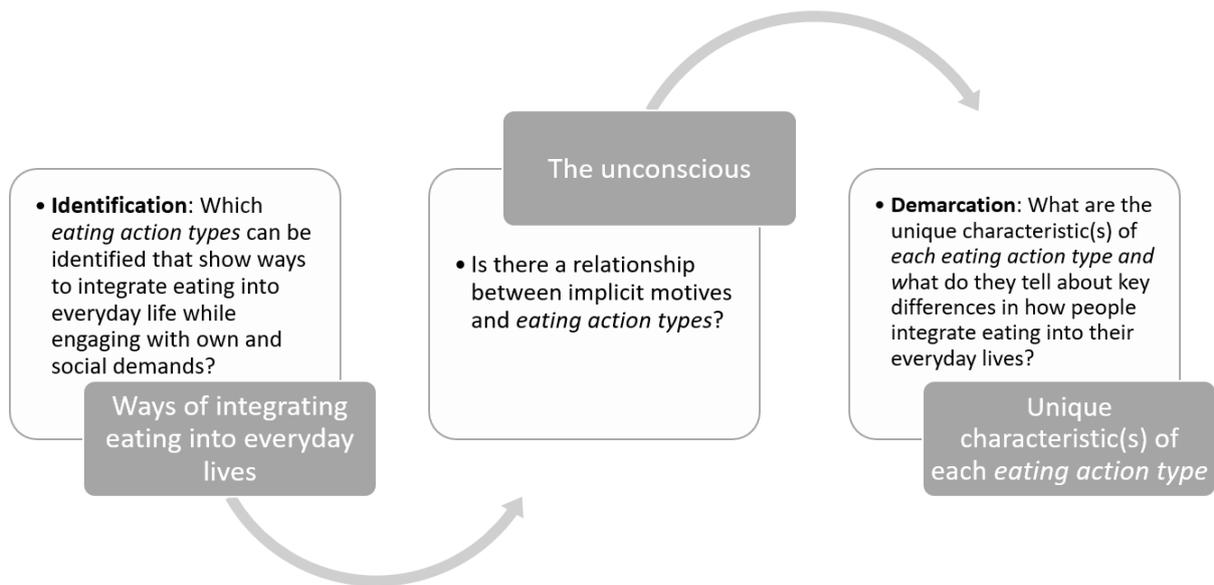


Figure 5 Theoretical model of study phase 2

In the following chapter, the methodological procedure for providing answers to research questions of study phase 2 is described in detail. Subsequently, the results of study phase 2 is discussed, followed by a general discussion about the undertaken investigations, the methodological procedures implemented and the limitations of the investigations.

5 Methods

5.1 Procedure

In 2017, 42 interviews were conducted. The interviews took place at the Chair of Marketing and Management of Renewable Resources in Straubing, the Institute for Biomedicine of Aging in Nuremberg and at the home of the interviewees either in the City of Straubing or in the City of Regensburg. The contact to the individuals was sought through an email distribution list of the university, a recruitment call in a local newspaper and a contact list from previous studies. All individuals gave informed consent and the participation was voluntary. Furthermore, the Data Protection Officer of the HSWT approved the study procedure. In addition, the ethical principles of Helsinki Declaration, the German Research Foundation (DFG) and the German Society for Sociology (DGS) were met.

The interview guideline was developed after reviewing relevant literature about food-related behaviour. It consisted of six sections: It started with an introduction including formal consent followed by the application of the Operant Multi-Motive Test (OMT). This was succeeded by the personal food-related behaviour, which involved a 24-Hour Recall of the diet, combined with a problem-centred interview, concluded with a short questionnaire on personal characteristics including the use of the Personality Research Form (PRF)¹. The interview guideline was tested twice and slightly revised before use. All interviews were tape-recorded, except of one in which notes were taken (Flick, 2004; Witzel, 1985). Recording began with the start of the 24-Hour Recall and continued for the duration of the problem-centred interview, after which the recording device was turned off. All data has been

¹ The PRF was not relevant for study phase 2 and this summary.

anonymised and transcribed verbatim. None of the selected persons refused to participate or withdrew during the interviews. All respondents received €15 in recognition of their participation.

The interviews started with a short introduction, where the interviewer explained the procedure of the interview, and assured that there were no right or wrong answers and that the individual perspective were of great importance. The interviewer also emphasised that she was no nutritional expert, who could advise on nutritional matters. The handling of the OMT followed the introduction. People received as much time as needed to edit the OMT. The OMT was handed out as a pen and paper version. On average, people needed about half an hour for editing the OMT. After finishing, individuals were asked to go on with a 24-Hour Recall (Oltersdorf, 1984) about the previous eating day and the last Sunday, since weekdays and weekend days may vary. If the previous day was a Sunday, people were asked to discuss the last Friday as weekday (Stieß & Hayn, 2005). The 24-Hour Recall was used as a stimulus for getting into the topic and to activate the individuals to get deeper insights into their food-related behaviour. The 24-Hour Recall was followed by a discussion about the food-related behaviour of the individuals based on the problem-centred interview guideline.

The 24-Hour Recall and its subsequent discussion lasted between 21 and 61 minutes, with an average duration of 38 minutes. Finally, people filled in a personal questionnaire (Flick, 2004; Witzel, 1985). The data collection phase lasted up to two and a half hours per participant, with an average duration of two hours.

5.2 Participants

The aim for study phase 2 was to create a relatively heterogeneous group of individuals regarding age, gender, and a homogenous group regarding socialization and healthy eating practices. Hence, the criterion for inclusion was an age 18 or above (since for younger participants parental consensus is needed), a western European socialisation and a healthy attitude to the topic of eating. Forty-two individuals were recruited, but because of two incomplete OMTs, uselessness of one OMT, a different nationality and a disclosed eating disorder, five interviews were excluded. The study thus included 37 participants. However, saturation was reached as no new topics revealed during the interviews, what was confirmed in the analysis phase (Saunders et al., 2018).

The individuals of study phase 2 were between 18 and 83 years, including 19 men and 18 women socialized in western European culture. The BMI (Body Mass Index) of the individuals ranged from 19 to 35.4. Thus, 26 individuals were of normal weight, eight individuals were pre-obese and three individuals were obese (WHO, 2019). Moreover, 31 individuals were omnivore, three individuals were vegetarians and another three were vegans.

5.3 Materials

During the interviews, different materials were applied to comply with the aim of study phase 2. As incentive and as transition to the discussion about the subjective food-related behaviour, a 24-Hour Recall was used. This, the OMT, which records people's implicit motives and the personal questionnaire are presented below.

5.3.1 24-Hour Recall & problem-centred interview guideline

The 24-Hour Recall was implemented as followed: A set of cards with typical food was provided so that people could use the cards for the previous day and the last Sunday to show their meals. The eating days were divided into three sections: breakfast, lunch and dinner, whereas also snacks could be placed between meals. To be able to show each individual meal, writable cards were also offered, so that people could write down any special ingredient if it was not included on the cards (Figure 6).



Figure 6 Example of two laid eating days of one individual (f)

Source: own picture

The questions for the problem-centred interview considered the two dimensions of the eating action (Spiekermann, 2004) approach. Thus, certain questions covered the action processes, whereas other questions were asked to get insights into the interpretation processes of the individuals. Table 2 shows the distribution of questions between the two levels.

Table 2 Questions of the guideline divided into action and interpretation processes

Action Processes	Interpretation Processes
1. Type of groceries	1. Significance of eating in everyday life
2. Cooking behaviour	2. Emotions connected to eating
3. Arrangements of eating situations	3. Meaning of eating in company
4. Snacking behaviour	4. Inner conflicts regarding eating

Importantly, in the sense of a semi-structured interview, queries were always possible during the interviews (Brinkmann & Kvale, 2015). This meant that, in addition to the questions in the interview guideline, many additional essential aspects of food-related behaviour could be discussed – either because the persons mentioned aspects worthy of further discussion or because further questions arose, based on the additional statements made by the persons. For queries, the author worked with the technique of paraphrasing. In this technique, the spoken words are summarized to reflect whether they were understood correctly (Brinkmann & Kvale, 2015).

5.3.2 Operant Multi Motive Test

The OMT is based on the Thematic Apperception Test (TAT) (Murray, 1943) and its motive key (“Motivschlüssel”, Kuhl, 2013). However, the OMT is an extended version of the TAT, since a fourth motive, the motive for individual liberty, was added (Alsleben & Kuhl, 2010). In comparison to other projective psychological tests, the OMT is less time consuming, consist of more detailed testing for validity (Brandstätter, Schöler, Puca, & Lozo, 2013) and is available in German language. All these reasons predestined the OMT for use in this study.

The OMT consists of 15 pictures, each showing at least one person in a certain situation without facial expressions or gestures. Thus, the pictures were kept in such a way that they can be strongly interpreted (Figure 7).



Figure 7 Example of OMT picture
Source: Impart GmbH (2020)

For each picture, the people had to answer three questions in a few words or short sentences, namely: 'What is important for the person in this situation and what is he or she doing?', 'How does the person feel?', and 'Why does the person feel like this?'. If the picture to be described showed more than one person (Figure 7), the persons had to choose a protagonist for each picture and answer the questions about the protagonist.

5.3.3 Personal questionnaire

The personal questionnaire included the Nestlé nutrition type test and a question about the importance of certain aspects when purchasing groceries. These two sections were queried by applying a 4-point Likert scale. This was followed by questions about:

- | | |
|--|------------------------------------|
| 1. The frequency of cooking by using fresh ingredients | 8. Age |
| 2. The average duration of eating situations | 9. Heights |
| 3. Whether the canteen is used and if so why | 10. Household size |
| 4. The purchase of ecological groceries | 11. Occupation |
| 5. An estimate of the kilocalories personally required | 12. Highest educational attainment |
| 6. The PRF | 13. Monthly net income |
| 7. Gender | |

5.4 Data analysis

The different data collected required different analysis techniques that are presented in the following for each material used.

5.4.1 *Part 1: 24-Hour Recall & problem-centred interviews*

The starting point for the analysis of the problem-centred interviews were the transcripts of the 37 individuals. For the analysis of the interviews, the software MAXQDA was used (Rädiker & Kuckartz, 2019; Verbi GmbH, 2020).

5.4.1.1 Content structuring qualitative analysis

The first step for the analysis of the problem-centred interviews was the application of a content structuring qualitative analysis by Kuckartz (2016), which aimed to identify topics and sub-topics and their systematization and conceptualization. An inductive-deductive (Kuckartz, 2016) analysis technique was applied, where the deductive codes resulted from the interview guideline based on the literature review. The analysis technique described a methodical rule-guided procedure, which was carried out gradually. The scientific quality was ensured by the orientation on this procedure. As a result, a hierarchical code-system was obtained (Kuckartz, 2016) with 15 main categories and multiple sub-codes. The main categories were assigned either to the action processes or to the interpretation processes of the *eating action* approach. Consequently, adequate text passages were assigned to respective suitable codes. In order to comply with qualitative research standards, the assignment from text passages to codes were done by two persons separately and compared afterwards. In case of disagreement, the coders discussed until agreement was reached (Kuckartz, 2016).

5.4.1.2 Type-building qualitative content analysis

Based on the code-system of the content structuring qualitative analysis, the second step to analyse the problem-centred interviews was another methodological controlled procedure, type-building qualitative content analysis (Kuckartz, 2016), aimed to build different *eating action types*. The *eating action typology* is the result of a grouping process at which by means of one or more features, a social condition is divided into types. This method aims to build groups that are as homogeneous as possible within the group and as heterogeneous as possible in group comparison (Kluge & Kelle, 2010; Kuckartz, 2016).

The building of the *eating action types* took place in group work and went through several phases of grouping the cases into *eating action types* and assigning the cases to the resulted *eating action types* (Kuckartz, 2016). Seven polythetic *eating action types* emerged, meaning that the individuals of one *eating action types* must not be identical, but as identical as possible (Kuckartz, 2016). Moreover, these are real types (Kuckartz, 2006), meaning that each type is constructed out of different text segments from different individuals belonging to one type. Thus, the type is not existent in the form presented, but the presented text segments belong to living individuals. Only relevant text segments are selected according to the criterion of plausibility for the type to be described and assembled across all cases (Kuckartz, 2006).

The results of the analysis of the problem-centred interviews are presented in paper II (Figure 8).

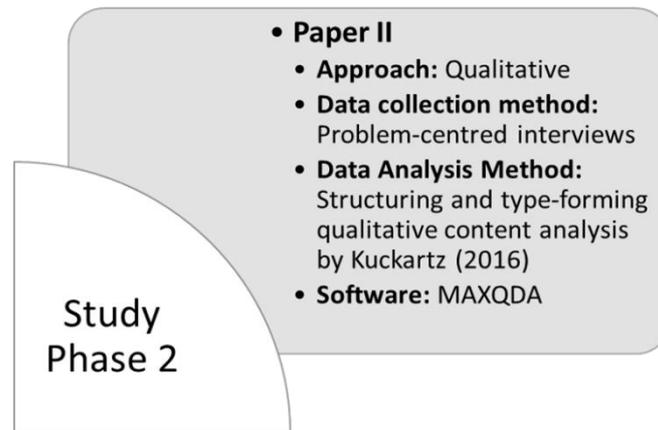


Figure 8 Overview of the procedure of paper II

5.4.2 Part 2: Operant Multi Motive Test

The OMT was coded systematically by IMPART GmbH, which developed this projective psychological test (Impart GmbH, 2020). In addition, the author of this thesis attended a course held by IMPART GmbH, in which the systematic of coding was learned. The author additionally coded the interviews independently. The compliance rate was around 60%. The sum of categories divided by the number of pictures ($n = 15$) ($\sum Ki 1/n$) provided insights into the peculiarity of each motive for each individual participant. Therefore, the motives were divided into the values *low-level motive*, *lower average motive*, *upper average motive* and *high-level motive*. Upper average and high-level motives were defined as dominant motives. By applying this procedure, the dominant motive(s) of each individual could be identified. According to Krug and Kuhl (2006), international studies have shown that in about 60% of people one motive dominates, in 30% the dominance of two motives is observed, in 5% all three motives dominate and in the remaining 5% none of the motives predominates.

For paper III (Figure 9), the motive structure of each *eating action type* was analysed, focusing on the most dominant motive of each individual of the same *eating action type*. In addition, the second strongest motive of each individual was also checked, if it exceeded the threshold of a dominant motive. Then the absolute frequencies of the dominant motives per individual was used (one or two) as an indicator to assume one or two dominant motives within an *eating action type* and to describe its motive structure. Individuals usually have one or two dominant motives. If the majority of individuals of a type was strong in one motive, then this was also assigned to the type itself. If the majority of individuals was strong in two motives, this fact is assigned to the type. Therefore, it was possible that due to the dominant motives of the individuals, two motives with the same frequency appear to be dominant, but the *eating action type* itself only shows one strong motive. This is because of the fact that the majority of individuals of a certain *eating action type* were strong in only one motive. In addition, the particularly weakly developed motive was also considered, if it exists within an *eating action type*.

The results of the analysis of the OMT are presented in paper III (Figure 9).

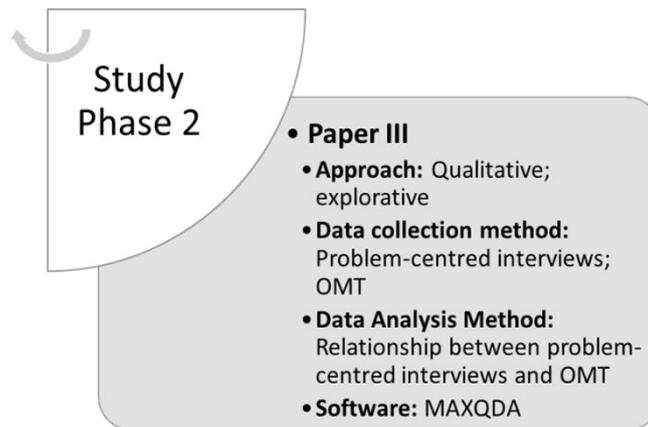


Figure 9 Overview of the procedure of paper III

5.4.3 Part 3: Problem-centred interviews & personal questionnaire

The basis for the mixed-methods analysis of the problem-centred interviews were the transcripts of the 37 persons as well as the personal questionnaire that each person had to fill in at the end of each interview. The MAXQDA software and the SPSS software were used for the analysis.

5.4.3.1 Quantitative content analysis

Using its special feature, MAXQDA (Verbi GmbH, 2020) was used to perform a quantitative content analysis. For this purpose, a self-developed dictionary was used, which contains categories formed from words similar in content. In order to consider only meaningful words, a go-list was created, which excluded words that were irrelevant for the topic. In order to check subsequently whether the statements of the participants fitted into the counted category, the reference list with the respective text passages for each category was personally checked. This process was repeated until the output was free of errors.

5.4.3.2 Cross-over analysis

A data transformation in terms of quantification of the qualitatively obtained data was implemented in order to be able to perform a cross-over analysis. The cross-over approach included the use of a cross tab and a point biserial correlation.

5.4.3.2.1 Cross tab

A cross tab, which is based on the categories developed in the course of the qualitative content analysis, was done. Nonetheless, the cross tab contained only categories of high value, namely if more than 57.14% of the individuals of one type were assigned to a category. This line was drawn to satisfy the majority of each *eating action type* and it was the lowest value above 50% given by the cross tab.

5.4.3.2.2 Point biserial correlation

Subsequently, the results of the cross tab were checked by calculating a point biserial correlation using SPSS (IBM, 2020). For that procedure, qualitative data was transformed into numeric values. For the analysis of the relationship between an interval-scaled variable (number of category counts) and a dichotomous variable (*eating action type*) the point biserial correlation is particularly useful (Cohen, Cohen, West, & Aiken, 2003).

5.4.3.3 Personal Questionnaire

With the help of MAXQDA, basic socio-demographic aspects and their distribution within each type and in comparison to each other were analysed, considering gender, age and weight.

Paper VI includes the findings of the mixed methods procedure (Figure 10).

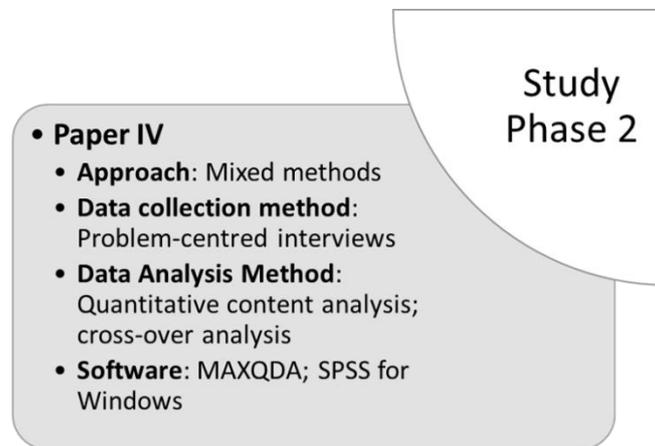


Figure 10 Overview of the procedure of paper IV

Summarizing, study phase 1 resulted in paper I. The evaluation of the problem-centred interviews of study phase 2 were presented in paper II, where the seven built *eating action types* were described. Paper III considered the relationship of the results of the OMT and the *eating action types*. Paper IV applied a mixed methods approach based on quantified qualitative data of the problem-centred interviews to obtain the unique characteristic of each *eating action type* (Figure 11).

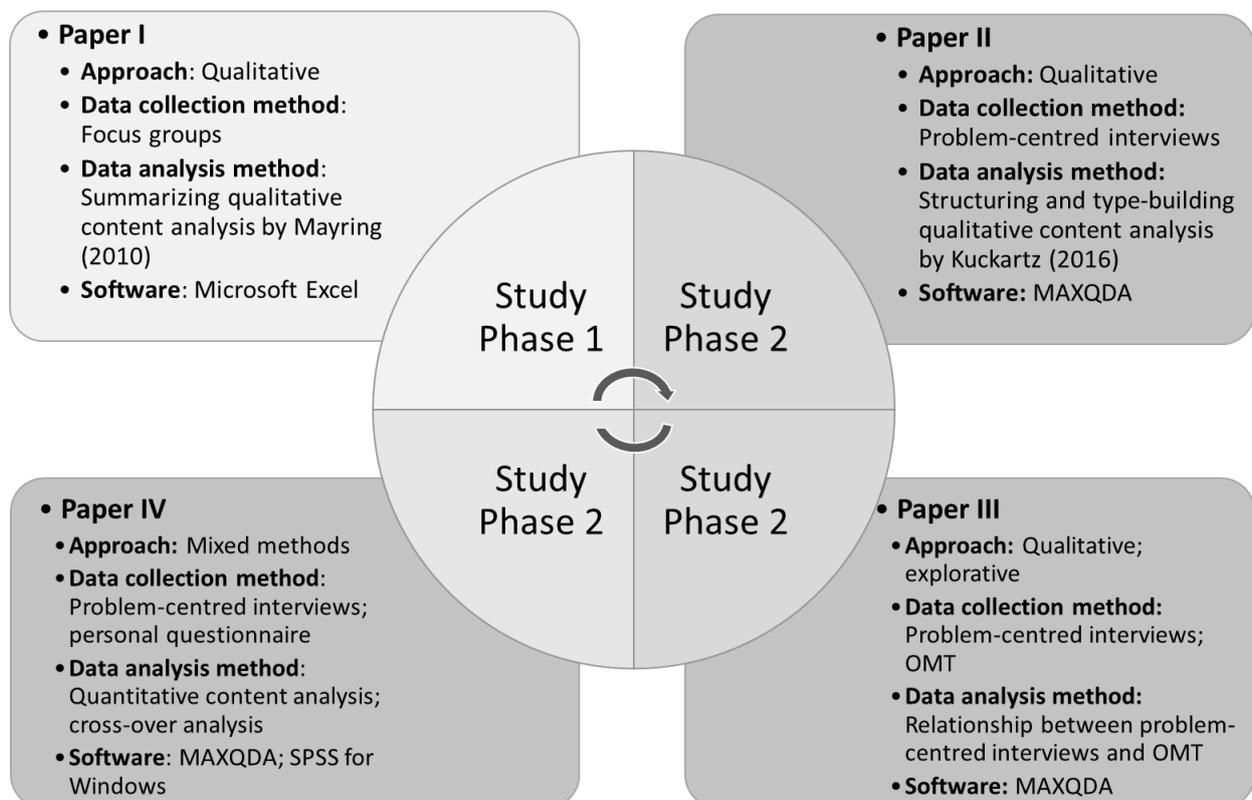


Figure 11 Overview of resulting paper from data collection of study phase 1 and 2

6 Publications & results – study phase 2

6.1 Ways of Integrating Eating into Everyday Lives – A Qualitative Study in Germany

The article 'Ways of Integrating Eating into Everyday Lives – A Qualitative Study in Germany' was submitted to the *International Journal of Consumer Studies*. The doctoral student of this work was the first author of the article, and conceived, designed and carried out the experiments, analysed the data and wrote the paper. The third author supported the first author in the evaluation of the data. The second and the fourth author contributed to the writing process of the article and approved the submitted version. The full citation of the article is the following:

Publication II

Lampmann Lyn, Emberger-Klein Agnes, Grau Madlen and Menrad Klaus (2021) Ways of Integrating Eating into Everyday Lives – A Qualitative Study in Germany.

Status: Submitted

The presentation of the results of *part 1* of study phase 2 is the summary of the written publication.

Food has many different functions that go beyond the purely biological, as it also has social, cultural and psychological functions. It is important for belonging and closeness, self-esteem and emotional security, but it can also foster fear and guilt (Feichtinger, 1998). Therefore, food-related behaviour is an overly complex human behaviour, which is difficult to understand in all its facets (Holm & Gronow, 2019; Murcott, 2000; Warde, 2016). Due to this complexity, different interdisciplinary approaches exist what leads to no uniform and coherent nutritional knowledge and behaviour (Ott, 2017; Schnurr, 2006; TNS Infratest GmbH, 2009).

One possibility to reduce the complexity of a field of investigation is to build a typology, which is the result of a grouping process in which subjects or objects are sorted into similar types according to predefined characteristics (Kluge, 2000). Thus, the aim of type-building (Diaz-Bone & Weischer, 2015; Kuckartz, 2014b; Silver, 2013) is to reduce the data to a few manageable and substantial terms (Diaz-Bone & Weischer, 2015). Type-building can be done either by quantitative research methods, or by qualitative research methods (Diaz-Bone & Weischer, 2015) and has often been used for both commercial and scientific purposes.

For commercial purposes, commercial market research institutes have built nutrition typologies, primarily to explain food demand (Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Janke, 2009). These have mostly used multivariate statistical methods to arrive at their results (Oltersdorf, 2019). However, there are also scientific studies that have developed nutrition typologies, usually having a specific thematic focus, such as pleasure (Kluß, 2018), healthy eating (Blake et al., 2013) or obesity (Brunsø et al., 1996). These also mostly use quantitative methods, sometimes in combination with qualitative methods (Stieß & Hayn, 2005).

In contrast to the commercial and academic nutrition typologies, this study examined how people integrate eating into their everyday lives while engaging with themselves and the environment and thereby experience personality development and the associated socialisation. In doing so, this study referred to the conception of human being according to Hurrelmann and Bauer (2015). According to this, personality development is a definitional component of socialisation, the lifelong acquisition of and confrontation with natural predispositions, especially with the basic physical and psycho-

logical characteristics as well as with the social and physical environment (Hurrelmann & Bauer, 2015). In addition, the study's understanding of food-related behaviour was subject to that of Spiekermann's (2004) eating action.

In order to get closer to the action and interpretation processes implied in Spiekermann's definition of eating, qualitative data collection was appropriate, since it advocates a humanistic view of human beings, in which people have free will and the need for self-actualisation (Rogers, 2020; Schumann, 2018). The aim of this research was to build types by means of type-building qualitative content analysis (Kuckartz, 2016).

The results were seven *eating action types*, with varying extents in action and interpretation processes. In order to emphasise their essential characteristics, they have been named as follows: *Eating as a way of life* (n = 3); *The Relaxed* (n = 7); *Eating as self-determination* (n = 7); *Eating as a necessary Evil* (n = 3); *The Adaptive* (n = 5); *The Overstrained* (n = 8); *The Controlled* (n = 4).

In short, *Eating as a way of life* is characterized by the fact that they follow an idea of an ideal nutrition, such as veganism, which has impact on all areas of life. Moreover, this type is strong in both action and interpretation processes. *The Relaxed* is marked by its relaxed access to its own food-related behaviour and is high in its action as well as in its interpretation processes. For the *eating action type Eating as self-determination*, it is important to make independent decisions and to live independently; food-related behaviour is also used for this purpose, for example to distinguish oneself from others. The reported action processes are rather high, whereof interpretation processes are by way of comparison lower. *Eating as a necessary Evil* does not see any special importance in food and eating, rather, it is perceived as something that must be done for survival. *Eating as a necessary Evil* reported rather high action processes, but low interpretation processes. *The Adaptive* is strongly oriented towards the food-related opinions and actions of other people, has no own food-related behaviour patterns and feels comfortable. The action and interpretation processes are reported as being low. *The Overstrained* feels stressed, frustrated, overwhelmed or bored by the food-related behaviour due to internal or external circumstances and reported relatively strong interpretation processes and less strong action processes. *The Controlled* is characterised by its controlled behaviour, which is accompanied by balancing and compensatory measures. In this type, the body is situated at the centre of the control. The strong need to control the own behaviour is the only reported strong action process, which is why it is characterised by low action processes. The interpretation processes are rather high.

The chosen method of type-building and the consideration of action and interpretation processes from the perspective of the individual contributed to a broader understanding of how people integrate eating into everyday lives while engaging with themselves and their environment and at the same time complement the findings of existing commercial and scientific nutrition types.

6.2 Is there a relationship between implicit motives and eating action types – An exploratory study in Germany

The article 'Is there a relationship between implicit motives and eating action types – An exploratory study in Germany' was submitted to the *Journal of Consumer Culture*. The doctoral student of this thesis was the first author of the article, and conceived, designed and carried out the experiments, analysed the data and wrote the paper. The second and third author contributed to the writing process of the article and approved the submitted version. The full citation of the article is the following:

Publication III

Lampmann Lyn, Emberger-Klein Agnes and Menrad Klaus (2021) Is there a relationship between implicit motives and eating action types – An exploratory study in Germany. *Journal of Consumer Culture*. Doi: 10.1177/14695405211013954

Status: Published

The presentation of the results of *part 2* of study phase 2 is the summary of the written publication.

Food-related behaviour is mainly an unconscious behaviour (Köster, 2009; Wansink & Sobal, 2007). However, this fact was rarely considered in consumer and sensory studies. Only in culturally/sociologically oriented research, the unconscious behaviour played a role, this is because the view of the exclusively rational consumer has been largely abandoned and instead practice-theoretical approaches are increasingly being considered (Plessz & Wahlen, 2020; Warde, 2016). The influence of the unconscious on everyday actions is strongly supported in cultural studies and sociological consumer research.

However, from an empirical perspective, researchers still apply standardised questionnaires to investigate human food-related behaviour (Costa et al., 2007; Nielsen et al., 1998; Rejman & Kasperska, 2011). Yet, as long as people do not have access to their unconscious, to ask people about their unconscious is not feasible. Moreover, asking people about unconscious processes furthers storytelling, since people tend to try to find answers to each question (Köster, 2009; Wilson, 2002). This is one reason why the causes of individual food-related behaviour are still a complex topic from a scientific perspective. Therefore, Köster (2009) and Hanna, Wozniak, and Hanna (2013) call for the development of a new methodology that works with implicit approaches to better understand human food-related behaviour. In addition, Köster (2009) calls for more interdisciplinary research in this area.

Generally, human behaviour is often explained by the theory of motivation. Part of this are the implicit motives that strongly influence human behaviour because they occupy a lot of space in the mind (Krug & Kuhl, 2006). These implicit motives are about affiliation, achievement and power (Krug & Kuhl, 2006). However, Asleben and Kuhl (2010) added a fourth motive, the motive for individual liberty. These implicit motives must be satisfied in order to maintain a certain level of well-being (Kuhl, 2001). They arise through personal initiative and respond to intrinsic incentives.

It was stressed that food-related behaviour is a very important and often unconscious human behaviour. Moreover, it was underlined that implicit motives have a strong influence on human behaviour and form an important part of the unconscious (Krug & Kuhl, 2006; Kuhl, 2013). Accordingly, this study addressed the question of whether there is a relationship between implicit motives and food-related behaviour and how this connection is shaped.

To answer this question, this study looked at people's food-related behaviour using seven *eating action types* built in a previous study (Lampmann, Emberger-Klein-Agnes, Grau, & Menrad, n.d.). The *eating action types* are based, on the one hand, on Hurrelmann and Bauer (2015) conception of human beings, in which personality development forms an essential part of socialisation and humans engage with their inner and outer reality. In this context, successful socialisation is the successful assertion of subjectivity and identity after confronting social structures through participation. On the other hand, the study referred to Spiekermann's (2004) understanding of eating action, which is based on action and interpretation processes.

In order to determine the implicit motives, the Operant Multi-Motive Test (OMT) was applied. A descriptive analysis of the data by comparing the *eating action types* with the results of the OMT was

offered. To evaluate the motive structure of each *eating action type*, it was looked at the most dominant motive of each individual of the same *eating action type* as well as the second strongest motive of each individual when the latter crossed the threshold of a dominant motive. Subsequently, the absolute frequencies of dominant motives per individual were used as an indicator to assume the existence of one or two dominant motives within an *eating action type* and to describe the motive structure of the *eating action type*.

In short, the motive structure of the seven *eating action types* is as followed: The individuals of *Eating as a way of life* are only dominant in one motive, whereby the prevailing motive is either power or individual liberty. Affiliation can be identified as the weak motive of this type. *The Relaxed* tends to have two dominant motives, with power as the most frequent one, followed by achievement. A particular weak motive is not identifiable for this type. *Eating as self-determination* is only dominant in one motive, which is either power or achievement. Within this type, the motive for individual liberty is particularly weak. *The Adaptive* has two dominant motives, which are achievement and individual liberty. *The Overstrained* is only dominant in one motive, whereof the most frequent one is power, followed by achievement and is particularly weak in affiliation. *The Controlled* is only strong in power and particularly weak in individual liberty.

The results of this study suggested that implicit motives have an influence on food-related behaviour. Therefore, they may be of particular interest to interdisciplinary researchers who want to understand the relationship between individual and social behaviour, between unconscious and conscious contexts of behaviour, or who want to understand (un)comfortable or (un)consistent behaviour due to a discrepancy between implicit and explicit motives. Accordingly, nutrition consultancies, food companies, policy makers and advisors may also be interested in the insights gained in this study on the influence of the unconscious on food-related behaviour.

6.3 Determining the Distinguishing Features of Different Eating Action Types in Germany using a Mixed-Method Approach

The article 'Determining the Distinguishing Features of Different Eating Action Types in Germany using a Mixed-Method Approach' was submitted to *Frontiers in Nutrition*. The doctoral student of this work, who was the first author of the article, conceived, designed and carried out the experiments, analysed the data and wrote the paper. The second and third authors contributed to the writing process of the article and approved the submitted version. The full citation of the article is the following:

Publication IV

Lampmann Lyn, Emberger-Klein Agnes and Menrad Klaus (2021) Determining the Distinguishing Features of Different Eating Action Types in Germany using a Mixed-Method Approach

Status: Submitted

The presentation of the results of *part 3* of study phase 2 is the summary of the written publication.

In the first research step (publication II), seven *eating action types* were build based on a qualitative individual-centred approach. Next, the unique characteristic of each *eating action type* were analysed more profoundly to better demarcate them from each other and emphasise their differences in integrating eating into everyday lives against the background of (competing) individual and social demands. Thus, the qualitative part of the study design aimed at building a typology about how peo-

ple integrate eating into everyday lives while engaging with themselves and the environment. In contrast, in the quantitative part it was focused on individual variables (Schumann, 2018) for the identification of the unique characteristic(s) of the different *eating action types*.

In order to comply with the study objective, a quantitative content analysis was performed. In addition, data transformation was implemented to apply a cross-over analysis, which implied the use of a cross tab and a point biserial correlation.

For *Eating as way of life* (n = 3; 2 women, 1 man), the main food-related contents are body reference and subjectivization. The significant unique features are an idea of an ideal nutrition, behavioural change through information gathering, claims management, rewarding, relate to others, and belief in natural physical needs. Body reference and community mark *The Relaxed* (n = 7; 4 women, 3 men) as main food-related contents. The significant unique features are positive affect towards eating day(s) and importance of being satisfied. Intended behaviour and community are the main food-related contents for *Eating as self-determination* (n = 7; 5 women, 2 men), where the significant unique features are self-determined daily structure and development of own structures. *Eating as a necessary Evil* (n = 3; 2 women, 1 man) is marked by habits as main content of food-related behaviour, the only significant unique feature is rare cooking. Habits also play major roles for *The Adaptive* (n = 5; 1 woman, 4 men). Significant categories for this type are adaptation to fellow human beings and eating as an important part of family life. *The Overstrained* (n = 8; 2 women, 6 men) mainly refers to the body reference and intended behaviour, the significant unique features are overstraining, negative affect toward eating day(s), eating as distraction, guilty conscience. *The Controlled's* (n = 4; 2 women, 2 men) main food-related contents are body reference and control behaviour, whereof relating to others, balancing behaviour, weighting process and exceptions (from control behaviour) represent the significant unique features.

In this study, it was shown which aspects play relevant roles when it comes to how people integrate eating into their everyday life and thus experience personality development and related socialisation. These are aspects such as the idea of an ideal diet that leads to physical and ethical well-being, a relaxed attitude towards food, self-determination, the body as an instrument of control, adaptation and overstraining. In this context, the reference to the body and the community repeatedly plays an important role across types.

This study is the first food-related consumer segmentation study for Germany that uses a mixed-methods approach and thus expands the methodological toolkit in this field. The results of this study enable nutrition consultancies, food companies, policy makers and consultants to take into account the different ways people integrate food into their daily lives in their specific activities. This could lead to an improvement of the success of commercial companies, but also increase the effectiveness of policy initiatives, advisory and educational activities in the field of nutrition and food.

7 Discussion

The following section provides an overall discussion of the thesis. For this purpose, the essential results of this work are discussed. Then, the methodological approach of the thesis is reviewed, including an elaboration on the limitations of the study. This section concludes with suggestions for possible future research topics.

Since the thesis is divided into two study phases, firstly, a general discussion about the results of both study phases is undertaken, followed by the discussion about the methodology of study phase 1 and 2.

7.1 Discussion of results of study phase 1 & 2

Older people (65+) often suffer from sarcopenia, the loss of muscle mass, strength and function what often limits their quality of life and their independence. In order to foster an independent living for the older generation, this work initially aimed to develop protein-rich drinks for older people in order to prevent sarcopenia. For this aim, three FGs (n = 25) were conducted to test different commercially available PDs. The aim was to get insights into the aspects that influence the target group's perception of these drinks. According to current knowledge, to date no such study has been carried out in Germany.

One major finding was that older people consider important aspects when they generally purchase food, namely freshness, naturalness and locally grown ingredients. Moreover, groceries must be purchased from a trustworthy manufacturer or distributor. These aspects lead to a general distrust towards the modern food industry and its products, since both often do not comply with these criteria. This finding was confirmed by literature, indicating the correlation between age and the interest in consuming natural products or products of natural ingredients, respectively (Roininen, Lähteenmäki, & Tuorila, 1999; Steptoe, Pollard, & Wardle, 1995). The tested PDs did not fulfil the participant's requirements.

The second major finding was the contradictory information coming from the modern food industry and modern health care system, leading to confusion and uncertainty about the participant's special need for protein in old age. This led them in turn to neglect the necessity to consume additional protein. This fact was a new finding, as it could not be found in literature so far. Only van der Zanden et al. (2014) asked about the knowledge (Best & Appleton, 2013; Engel, 2004; Tieland et al., 2015) of the participants regarding their special protein requirement and concluded that the participants were aware of the importance of protein consumption, but not about its special physiological function (van der Zanden et al., 2014). Hence, participants of the FGs would not consume the PDs on demand, unless their own family doctor recommended an additional protein intake. The special importance of trust, which is generated through recommendations by the family doctor, is confirmed by literature (Korzen-Bohr & O'Doherty Jensen, 2006; van der Zanden et al., 2014). On top of this rejection based on the participant's value system, the taste of the PDs could not convince the target group. This could be explained with the desired characteristics of purchased food, namely freshness and naturalness.

Finally, the individuals of study phase 1 did not know how the PDs could be integrated in their daily nutrition. They could not specify whether it was a standalone product or a product to drink while eating. The type of drink has left them irritated, as they have never had contact with such product before.

In conclusion, the study revealed criteria that influenced the perception of the commercially available PDs negatively. It seems that the PDs did not fit the target group's perception, as the products did not consider their needs in any way. On the contrary, the PDs only reflected criteria that prevented the target group from consuming them.

Thus, the collaboration with family doctors was suggested to raise awareness for a heightened protein requirement in old age, since the participants perceive them as trustworthy. As the majority of older people visit their family doctor regularly (Statista 2020, 2010), cooperating with them could be a useful way of explaining these special nutritional requirements in an atmosphere of trust, in the best case leading them to consume a certain amount of protein, even if the persons feel healthy. Since van der Zanden et al. (2014) found similar results, this approach seems promising, but has not

yet been considered as a viable policy in the German health care system. Nonetheless, the specific ideas and wishes of older people should be investigated in future studies. Additionally, other flavours and other product types should be included in future studies as well.

Furthermore, the results of the first study phase led to the realisation that both individual and social demands influence food-related behaviour, but a consistent picture of the different ways how people integrate eating into their everyday lives and deal with these very aspects did not emerge due to the focus on product evaluation. Food-related behaviour is a complex phenomenon, which can take place consciously as well as unconsciously. The aim of the second phase of the study was therefore to consider the diverse factors influencing food-related behaviour (Pudel & Westenhöfer, 2003; Spiekermann, 2004). Therefore, it was looked at both action and interpretation processes from an individual point of view. Further, the relationship between implicit motives on food-related behaviour was considered. Finally, the distinguishing characteristic(s) of each type were identified and analysed for significances to demarcate the seven *eating action types* even more clearly from each other and to provide a first step towards generalising the typology built.

For the first research step of study phase 2, a typology was built to make the various forms of food-related behaviour more tangible. Seven *eating action types* were developed, presented in 6.1.

As one major finding, different degrees of action and interpretation processes for each *eating action type* were analysed. The following section draws on existing research for each *eating action type* and explains the specific way in which they integrate eating into everyday lives and experience personality development and related socialisation.

According to Klotter (2016), individuals of *Eating as a way of life* are to be understood as 'alternative eaters'. He sees the alternative form of eating as a spiritualisation of food and the body. Both are woven into a web of meaning that makes them ecological or ethical and thus perceived as the victory of the spirit over the body. In his opinion, the alternative form of eating represents a conscious form of self-realisation. Therefore, the emphasis on the type's own aspirations can be interpreted as a differentiation mechanism (Totaro & Marinho, 2019), since personality development is also a matter of external perception, as it develops through the interaction of the individual with the environment (Hurrelmann & Bauer, 2015; Klotter, 2016).

The Relaxed, having a relaxed access towards food, seemed to have the ability to eat in a moderate way (Dijker, 2019). This concept implies major components for eating, being perception, consciousness and motivation and results in an food-related behaviour without self-control and without abandoning pleasure (Dijker, 2019).

People of the type *Eating as self-determination* put a lot of emphasis on their own well-being and autonomy. The Self-Determination Theory (SDT) explains motivation as energy to become active. This theory distinguishes between different forms of motivation (Deci, E. & Ryan, R. M., 2000); one is the intrinsic autonomous motivation. It is about self-motivation to achieve the own goals by means of voluntarily used resources (Sheldon & Elliot, 1998).

Eating as a necessary Evil emphasises the predominantly importance of contextual aspects rather than ones linked to food itself. A reason for this could be the old age, that this type usually is found in (\bar{M} 81.7 \pm 1.2 SD) and '*ageing (...) poses an increased risk of isolation and lack of social interaction, particularly at meal times.*' (Cappelletti et al., 2010). Instead, other aspects than nutrition, such as social interaction, were of great importance. By making food unimportant, it signals to others what is really important to this *eating action type*. This also means following a certain lifestyle and living one's own values and identity.

For successful adaptation, certain values must be present, namely identity preservation, voluntariness and desired adaptation, and the existence of suitable circumstances for adaptation (Chernyakova, 2014). If these aspects are given, adaptation goes along with well-being, as seen within *The Adaptive*, reflecting the personality of this type.

People who are among *The Overstrained* see their options for action as somehow limited. In the literature, various reasons are given for the feeling of being limited (Green, 1993; Naigaga, Pettersen, Henjum, & Guttersrud, 2018; Spiteri Cornish & Moraes, 2015). One reason is competing external expert recommendations that create a sense of confusion (TNS Infratest GmbH, 2009). *The Overstrained* repeatedly emphasised the discrepancy between inner values, perceptions and desires and external circumstances and demands. This leads to people being insecure about their nutritional illnesses and reacting with frustration and apathy.

Sociological theories of action assume that the body is a controllable instrument that is subject to the will of humans (Klein, 2010; Lane, 2017), as it seems to be for *The Controlled*. Moreover, in the 20th century hegemonic Western culture industry, thinness became a dominant cultural ideal (Bordo, 1993) and is now the reference model that men and women usually refer to when they are concerned about their bodies (Hesse-Biber, 2007). Thus, body modifications are associated with success, since the winning types swim, run, and fight (Sieber, 1999) nowadays.

The results of this study step showed that food-related behaviour could not be considered independently of personality and social interaction. Klotter (2016) understands food as a language of cultural identity and as a means of self-demarcation. The findings of this study step shed light on the personality of individuals, which develops through the confrontation with inner and outer reality, including when it comes to food. The eating-action types were used to determine how people integrate eating into their everyday lives as a means of personality development and the associated socialisation (Hurrelmann & Bauer, 2015). In the process, similarities and differences were highlighted.

Next to the building of the *eating action types*, the aim was to analyse the impact of the unconscious on food-related behaviour. This was done by applying the OMT in order to identify the implicit motive of each individual and relate this to the particular *eating action type*. This approach was explorative, as there was no existent way of how to analyse the relationship between the food-related behaviour and implicit motives. However, the literature review allowed identifying explanations for the motive structures found within the *eating action types*.

Following Klotter (2016), people of *Eating as a way of life* are to be understood as "alternative eaters". The motive of individual liberty fits well into this picture, because eating differently due to the ideal nutritional idea, which promotes physical as well as ethical well-being, can be interpreted as a need for otherness and corresponding independence. Due to the strong emphasis on otherness, the power motive can be interpreted as fitting, as the constant emphasis on otherness towards others can create a feeling of influence.

The Relaxed was considered to be an implementer of a moderate way of eating (Dijker, 2019). This can be explained by the motives of achievement and affiliation. The moderate way of eating implies the perception as a caring approach to other people and eating (affiliation) and the motivation in relation to cooking (achievement). Both implicit motives were identified within this type.

For *Eating as self-determination*, no literature was found that plausibly explains the motivational structure, which is either power or achievement as a dominant motive, of this type. Since food is unimportant and not associated with enjoyment for *Eating as a necessary evil*, it is characterised by the fact that there is no uniform overarching personal attitude towards food. Consequently, behaviour is only motivated when a person with their preferences encounters an environment where the

desired incentives are present. Since food has no relevance for this type, it is assumed that eating does not act as an incentive for motivational satisfaction.

The Adaptive is particularly weak in its pursuit of power. This result was expected, as the type is characterised by its adaptation to others. A dominant motive is individual liberty. Further, the need for subjects to maintain their identity in the process of adaptation was already stressed. Adaptation must be perceived as a desired action, moreover, the circumstances must be suitable for the subject to make the necessary changes (Chernyakova, 2014). Adaptation to others therefore takes place only when it is one's own desire. The motive of individual liberty fits to this.

It can be assumed that the overstraining of *The Overstrained* is influenced by a discrepancy between the implicit and explicit motives. Explicit motives, in contrast to implicit ones, are those that are cognitively elaborated and can be verbalised. They represent the image one wants to present of oneself to the outside world (McClelland, Koestner, & Weinberger, 1989). When implicit and explicit motives diverge, this leads to discomfort. Job, Oerting, Brandstätter, and Allemand (2010) showed that motivational discrepancy is related to emotional discomfort, while emotional discomfort is (partly) responsible for the link between motivational discrepancy and food-related behaviour. The results support the idea that people with motivational discrepancy eat more and prefer unhealthy, tasty foods because they want to down-regulate the emotional stress caused by motivational discrepancy (Job et al., 2010). Hence, this explanation means that the dominant motives found have no further significance for the time being. They would be significant if there were no overstraining and people of this type could be assigned to another *eating action type* to which they would belong without being overstrained.

The Controlled differs from all other types by the sole presence of a single dominant motive across all individuals of that type: the power motive. Individuals of this type exercise a strong control over their own bodies, which gives them social recognition. Through social recognition, individuals influence others by representing role models, strength or the common ideal of beauty (Görtler, 2012). Influence on others represents a form of satisfying the power motive. Therefore, control over one's own body produces effects of social power (Foucault, 2007; Klein, 2010).

It became clear that there were plausible explanations in the research literature for the implicit motive structure of *Eating as a way of life*, *The Relaxed*, *The Adaptive* and *The Controlled*, and based on the explanations it was also possible to describe how people consider (unconsciously) individual and social demands and integrate eating into their everyday lives. For *Eating as self-determination*, *Eating as a necessary Evil* and *The Overstrained*, the explanations were not so obvious; although it made sense that *The Overstrained* were in this predicament because of the discrepancy between explicit and implicit motives, and *Eating as a necessary Evil* did not see eating as an incentive for motive satisfaction. However, there were no plausible explanations for *Eating as self-determination*.

It must therefore be emphasised that the approach used is not able to conclude from a certain implicit motive structure to a certain corresponding *eating action type*, as individual motive structures could not be clearly assigned to individual *eating action types*. It was therefore only possible to analyse the motive structure of each *eating action type* and to find explanations for the connection between the *eating action type* and its motive structure by embedding the results in existing research literature.

However, this study was novel in that it connects implicit motives with food-related behaviour by applying the OMT to food-related behaviour. To date, the relationship between the food-related behaviour or the *eating action types*, respectively, and the implicit motives has not yet been carried out to current knowledge. Due to the explorative character, the findings had its weaknesses, but

contributed to research on the impact of the unconscious as implicit motives on food-related behaviour.

Finally, another objective of this research was to identify and statistically test for significance the different unique characteristics of each type in relation to how people integrate food into everyday life, engaging with themselves and the environment. The objective was achieved using mixed methods. Through the analysis, the study was able to show the main content(s) of each type when it comes to eating. The results of this analysis were compared with the results of other segmentation studies from Germany to highlight similar and new findings from this study.

An important finding of this study compared to the results of other segmentation studies is the identification of *The Relaxed* and *The Overstrained* as independent *eating action types*. The behavioural pattern of *The Overstrained* cannot be confirmed by other studies, where overstraining occurs within other types, but does not describe an independent food-related behaviour (Bruhn, 2008; Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Janke, 2009; Kluß, 2018; Stieß & Hayn, 2005). As Hayn (2008) and Jastran, Bisogni, Sobal, Blake, and Devine (2009) explain, everyday activities must be implemented actively; they must therefore be constructed, stabilized, maintained and changed by the individual (Hayn, 2008; Jastran et al., 2009). With regard to overstraining, the results of the present study indicate that many (in this study 8 of 37) people do not actively implement everyday food-related behaviour due to implicit motives that are not congruent with their explicit motives (Job et al., 2010; Lampmann, Emberger-Klein, & Menrad, 2021). Overstraining in the context of food-related behaviour is otherwise only considered in studies that focus on people with specific eating disorders (anorexia, bulimia, etc.) (Kathrein, 2019). However, as this study suggests, there are people with a healthy mental attitude towards eating who nevertheless feel overstrained.

In the group comparison, it became clear that the reference to the body occurs repeatedly, although the reference can have different origins, e.g., the need to feel good physically, or the need to maintain control over the body or to live in harmony with nature. In addition, the reference to the "community" is increasingly established, but here too from different perspectives, either because the presence of others is stressful or relaxing. The need for subjectivization and for control is unique: these two contents can only be found in one type, *Eating as a way of life* and *The Controlled* respectively, which clearly distinguishes them in particular. The cross-over analysis, in turn, confirms the results of the qualitatively built types and underpins the respective types in their characteristics, with which they distinguish themselves from each other.

By combining qualitative and quantitative research methods, it was possible to identify *The Relaxed* and *The Overstrained* qualitatively on the one hand and to confirm and underline it through statistical analyses on the other.

With the final objective of study phase 2, this study contributed to meaningful insights into the specifics of the respective *eating action types*. With this study, it was shown that quantitative analysis of the qualitative data was able to identify an improved distinction between the individual *eating action types* and showed their particular distinguishing features, providing a detailed insight into the characteristics of each type and a first step towards the generalisation of the qualitatively obtained data.

7.2 Methodological discussion – study phase 1

Qualitative methods are used in order to understand social phenomena (Wintzer, 2016). Thus, due to the uncertainty about the understanding of older people's protein intake and their attitude towards

PDs, it was decided to use a qualitative method to collect data on this topic. Since a product handling phase should be implemented, the decision fell in favour of an application of FGs, because they are used to evaluate and further develop products and services (Henseling, Hahn, & Nolting, 2006). According to Krueger and Casey (2015) there are three different phases of product and program development for group discussions. One of these phases consists of testing, revision and implementation. The aim is to test complete or partially developed concepts for offers, products or processes with regard to important criteria such as acceptance, attractiveness and comprehensibility (Krueger & Casey, 2015; Kühn & Koschel, 2011). Another advantage of FGs is the dynamic that develops among the participants, which has the potential to reveal additional information (Mayring, 2016). Moreover, through the dynamics of the conversation against the background of an open, trusting ambience, inhibitions, fears and resistance are reduced (Lamnek, 2005). Since qualitative data is never made completely accessible, mostly being conveyed through the researchers interpretation (Mayring, 2016), the main point of criticism against qualitative research methods is its subjectivity. However, qualitative research offers quality criteria which, if adhered to, ensures the quality of the data and the results (Mayring, 2016). Thus to counter the possible uncertainty factors of qualitative research different measures were taken: The interviews were held with the help of an interview guideline that was constructed from the general to the specific (Bohnsack, 2011) and which was especially constructed for the conduction of FGs. In addition, useful materials especially for FGs were used (Kühn & Koschel, 2011). Finally, a rule-based procedure for data analysis was applied (Mayring, 2010). As the PDs were the focus of the test and were to be evaluated by several people from the target group, the use of FGs was deemed a logical step. Both the preparation and recruitment phase as well as the realisation itself could be implemented without any problems. The participants were reliable and interested. The results were independent of the appropriateness of the choice of means.

7.2.1 Limitations

It must be stated that the small sample size of the FGs ($n = 25$) means that the results cannot be transferred to the general German population of older people (75+). Moreover, a special interest of the participants of the FGs cannot be excluded, since information about the special focus of protein during the FGs was provided previously. Another potentially undesirable influencing factor is the social desirability, which cannot be excluded due to group dynamics. Thus, group dynamics can lead to breaking mental barriers, but also to social desirability through the presence of other people and the research team.

7.3 Methodological discussion – study phase 2

As described in the introduction section of study phase 2, type-building aims to reduce complexity of originally complex issues. As the focus of this study was to enable individuals to set meaningful priorities in reporting on their own action and interpretation processes to get personal insights, 42 problem-centred interviews were conducted. Problem-centred interviews serve to build a theory in contrast to merely testing it. Thus, openness to new aspects is central to the problem-centred interview, although assumptions are made about the area to be examined. The guideline considers assumptions about the field of investigation based on a thoroughly literature review. However, during the interview itself, it is important to be willing to deal with new aspects and thus enrich previous knowledge with the new information obtained. In doing so, the interviewer assigns his or her own relevance to the respective phenomenon under investigation; the previous knowledge only shapes the guideline and serves to go further into the depth of the subject (Kurz, Stockhammer, Fuchs, & Meinhard, 2007;

Witzel, 1985, 2000). By using problem-centred individual interviews and using the 24-Hour Recall as an incentive to create a smooth transition to discussion, diverse and complex data on the food-related behaviour of Germans has been collected. The diverse analysis (type-building, the consideration of the unconscious, mixed methods) of the data confirms the adequacy of the means.

However, qualitative methods have their weaknesses. It is therefore extremely important to follow the rules that have been established to ensure their validity. In this study, the difficulties of qualitative research methods were addressed by two measures: By applying the essential features of problem-centred interviews, i.e. by developing a guideline, producing a record, using a questionnaire on socio-demographic data and producing a postscript (Witzel, 1985). Moreover, the difficulties were countered by the rule-based application of a content-structuring and type-building qualitative content analysis for the evaluation (Kuckartz, 2016). Additionally, the coding process was carried out by two persons independently and compared afterwards. In the event of disagreement, the matter was discussed until agreement was reached. This procedure is used to reach intercoder reliability (Kuckartz, 2016) and represents a quality criterion of qualitative research, as two persons coded the interviews.

Initially, the doctoral candidate of this thesis could not evaluate the OMT. As it was part of the publication III to analyse the connection between the food-related behaviour and implicit motives, IMPART GmbH was involved to analyse the OMTs. Nonetheless, since the results are presented as a PhD thesis, the doctoral candidate of this work had to analyse the OMTs herself as well. Thus, she attended a course where she was taught how to analyse the OMTs. Hence, both parties analysed the OMTs and in cases of doubts it was oriented towards IMPART due to professional knowledge with prior methodological experience. In doing so, both the request for a professional analysis and an analysis of the first author, were met.

For study phase 2 – publication IV, next to the qualitative research methods, quantitative research methods were applied. Mixed methods research is defined as *'the collection and analysis of both qualitative and quantitative data and its integration, drawing on the strengths of both approaches.'* (Creswell, 2015). Mixed methods serves to gain breadth and depth in understanding and corroboration (Johnson, Onwuegbuzie, & Turner, 2007). With publication IV, these advantages were used to get insights into the different ways of integrating eating into everyday lives at the background of individual and social demands.

7.3.1 Limitations

With regard to the problem-centred interviews, the recruiting criteria could have been set more precisely in advance. Since the only criteria for inclusion was an age above 18 with the aim to build a relatively balanced group in gender and a relatively heterogeneous group in age, two persons being not suitable for the investigation were revealed due to an eating disorder and another nationality. Thus, nationality and the existence of eating disorders should have been clarified in advance.

As the study was conducted in a specific context, some limitations arose. Again, possibly mainly people were recruited, who had an interest in the topic of nutrition. Moreover, the study was carried out exclusively in the state of Bavaria in Germany. It is therefore difficult to say whether the same or completely different results would have been found elsewhere. This would of course be particularly of interest to investigate in future studies. The design of the study is therefore well described and documented and can be repeated in this way at any time and compared with the results of the study on hand.

Data collection and analysis proved to be difficult and time consuming. However, there was no way of simplifying the collection and analysis. A larger research team would have made it possible to change coding teams, which would have counteracted the dynamic of matching between two coders, and the survey and analysis phase would have been quicker because the interviews could have taken place simultaneously. However, the risk of not obtaining consistent data is very high, as the interviews would have been conducted by different people. More in-depth training would have been required to conduct the interviews with a larger research team - but this in turn requires additional financial resources.

The *eating action types* are real types and reflect the result of a rule-based methodological procedure. Therefore, it is possible that the *eating action types* in their described pure form cannot be found in reality.

The main limitation of this work is the relationship of food-related behaviour and OMTs. The problem to be solved was the lack of a methodological approach to bring together the OMT and the *eating action types*. It was therefore necessary to decide how to conceptualise the investigation of the relationship. The question of implementation should have been considered in advance. Due to the non-existent procedure, the research team opted for a purely descriptive analysis describing the results of the OMT for each *eating action type*. However, the results were not as clear as expected.

Moreover, the quantitative content analysis using MAXQDA turned out to be somewhat more difficult than expected, as each result had to be personally reviewed by the author of this thesis. This rather time-consuming process is not guaranteed to be free of errors.

Subsequently, it is not possible to assign the older people from study phase 1 to the seven *eating action types*, because other participants were recruited for study phase 2. Certainly, it would have been interesting to analyse the distribution of the *eating action types* among the older participants of the FGs.

Future research

This study was conducted in a specific area of Germany (Bavaria). Therefore, it should be examined whether the identified *eating action types* could be verified for Germany in general and what would change if such an approach were to be transferred to other countries or cultures, as behaviour with regard to food and nutrition often differs between countries and cultures.

It would also be interesting to see to what extent this approach and results can be transferred to other areas of consumption. The question arises as to whether consumers behave differently, or whether similar types can be found, since this study was less concerned about the consumer object itself than about the consumers as individuals. In the light of this question, this approach could, after repeated testing, be used as a tool to identify the types in other consumption sectors. Due to the depth of the built types, they could also be used as a basis for future quantitative studies.

With regard to the link between unconscious and food-related behaviour, the challenge was to create a relationship that has not yet been investigated in this form before. It would therefore make sense to quantify the types on a large scale, e.g., by means of statistical analysis and a large sample, and to use analytical methods such as the T-test etc. for verification purposes. The aim would be to make statements about whether the *eating action types* can be found elsewhere and whether their motive structure is more by chance or with a certain probability.

8 Conclusion

The initial aim of this study was to develop a PD for the older generation to prevent them from developing sarcopenia. Therefore, it was necessary to investigate which important criteria a PD has to fulfil in order to be consumed by the target group. The results were very informative. There was general scepticism about the PDs, as they did not meet important criteria for older people when buying (healthy) food, and about target group-specific PDs, as the need for protein supplementation was not recognized. The general measures implemented by the industry and science (R&D) to improve the health status of Germans are good in theory, but have so far often failed in practice. Therefore, the cooperation with family doctors, which can be based on a personal and emotional approach, seemed to make sense against the background of the trust that is placed in them by the target group and which the food industry could not provide; as the goal of protecting the older generation from sarcopenia by promoting adequate nutrition was still convincing. Furthermore, the development of a target group-specific drink is one way of developing a suitable product. There is a need for further research here; the criteria developed must be implemented in a drink and tested again with the target group. This could be combined with other strategies, such as the development of other protein-enriched foods, which could be integrated into the target group's meals and into the technical and organisational routines of assisted living homes.

Although the results cannot be integrated into each other, the results of study phase 1 were the starting point for study phase 2.

With the building of food-related types, emphasis was put on how people integrate eating into their everyday lives while engaging with themselves and their environment. The result were seven *eating action types*: *Eating as a way of life*, *The Relaxed*, *Eating as self-determination*, *The Adaptive*, *Eating as a necessary Evil*, *The Overstrained* and *The Controlled*. Eating can be understood as part of people's personality development and related socialisation. People use food in order to express their personality through their consumption.

The complexity of the issue did not diminish when it came to the significance of the unconscious to food-related behaviour. Representing the second step of study phase 2, the aim was to gain insights into a possible relationship between implicit motives as part of the unconscious and mainly triggering behaviour, and food-related behaviour. Although it was a challenge to establish an adequate procedure to connect the implicit motives and the food-related behaviour due to a lack of rule-based methodological approaches for this relationship, the implicit motive structure of each *eating action type* could be identified. However, the results were not as unambiguous as expected, but still indicate certain tendencies in which the types can be placed. In addition, clear structures could also be identified as in the case of *The Controlled*, which are largely driven by the need for power, i.e., influence over others. Thus, this contribution was a first step towards the analysis of the impact of the unconscious on food-related behaviour.

The third step of study phase 2 was aimed at working out the unique characteristic(s) of the individual *eating action types* in order to better distinguish them from each other and to emphasise the differences in the integration of eating into everyday life in the confrontation with oneself and the environment. The results show that subjectivization, self-determination, the body as an instrument of power, adaptation to the environment and being overstrained are particularly pronounced when eating and furthermore show the distinctive characteristics for each type and provide a first generalisation of the results of the first research step of the second research phase.

Food-related behaviour is something very personal, as personality development can be lived through food-related behaviour, and in the process, it permeates human life in many different areas such as leisure, art, sex, work (Rozin, 2006). At the same time, it is an enormously important social issue; eating thus has two sides of the same coin, which cannot be considered independently of each other. Food-related behaviour reflects an interplay that on the one hand is decisively shaped by social norms, politics and the food industry and at the same time occupies a massive influence on these same social norms and values, on politics and on the food industry by supporting personality development. The interplay illustrates the complexity of the issue.

In sum, this work makes a significant contribution to understanding food-related behaviour. The building of the seven *eating action types* showed how people integrate eating into everyday lives while engaging with themselves and the environment. The influence of the unconscious on food-related behaviour was also emphasised, justified and investigated, thus taking a first step towards investigating this relationship. The identification of the unique features emphasised the differences between the types and tested them for significance in order to make a first step towards generalizing the results of the qualitatively built types. To comply with the different research steps, a wide range of methods were used (FGs; problem-centred interviews; qualitative content analysis according to Mayring (2010); qualitative content analysis according to Kuckartz (2016); quantitative content analysis and cross-over analysis). In this way, a significant contribution was made to the research of food-related behaviour. The topic was understood as a complex and partly unconscious issue by looking at it from different angles in order to do justice to its complexity and to draw both individual and social insights from the results.

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Appendix 1: Affidavit (German)

Anhang I

Eidesstattliche Erklärung

Ich erkläre an Eides statt, dass ich die bei der promotionsführenden Einrichtung
Fakultät für Wirtschaftswissenschaften

der TUM zur Promotionsprüfung vorgelegte Arbeit mit dem Titel:
How we eat - An Empirical Study of Human Food-Related Behaviour in Germany

in Lehrstuhl für Marketing und Management nachwachsender Rohstoffe, TUM Campus Straubing
Fakultät, Institut, Lehrstuhl, Klinik, Krankenhaus, Abteilung

unter der Anleitung und Betreuung durch: Prof. Dr. Klaus Menrad ohne sonstige Hilfe erstellt und bei der Abfassung nur
die gemäß § 6 Abs. 6 und 7 Satz 2 angebotenen Hilfsmittel benutzt habe.

Ich habe keine Organisation eingeschaltet, die gegen Entgelt Betreuerinnen und Betreuer für die Anfertigung von
Dissertationen sucht, oder die mir obliegenden Pflichten hinsichtlich der Prüfungsleistungen für mich ganz oder teil-
weise erledigt.

Ich habe die Dissertation in dieser oder ähnlicher Form in keinem anderen Prüfungsverfahren als Prüfungsleistung
vorgelegt.

Die vollständige Dissertation wurde in _____
veröffentlicht. Die promotionsführende Einrichtung

_____ hat der Veröffentlichung zugestimmt.

Ich habe den angestrebten Doktorgrad noch nicht erworben und bin nicht in einem früheren Promotionsverfahren für
den angestrebten Doktorgrad endgültig gescheitert.

Ich habe bereits am _____ bei der Fakultät für _____
_____ der Hochschule _____
unter Vorlage einer Dissertation mit dem Thema _____
_____ die Zulassung zur Promotion beantragt mit dem Ergebnis: _____

Die öffentlich zugängliche Promotionsordnung der TUM ist mir bekannt, insbesondere habe ich die Bedeutung von § 28
(Nichtigkeit der Promotion) und § 29 (Entzug des Doktorgrades) zur Kenntnis genommen. Ich bin mir der Konsequenzen
einer falschen Eidesstattlichen Erklärung bewusst.

Mit der Aufnahme meiner personenbezogenen Daten in die Alumni-Datei bei der TUM bin ich

einverstanden, nicht einverstanden.

Regensburg, 02.08.2021, Unterschrift

Appendix 2: Guideline FG1 (German)

Leitfaden: Fokusgruppe 75+ Jährige

Dauer: 130 Minuten

1. Einführung (15 Minuten)

- Begrüßung
- Vorstellung Institution: siehe Poster an Flipchart
- Kurze Einführung ins Thema:
 - *Im Mittelpunkt steht Testen von Eiweißgetränken*
 - *Hintergrund: Eiweißmangel im Alter häufig auftretendes Problem mit negativen Folgen für Gesundheit, z.B. Muskelschwund*
 - *Vorbeugen bzw. Entgegenwirken -> Ihr Verhalten und Ihre Meinung sind heute von Bedeutung*
- Anonymität und Fotos:
 - *Sind alle Teilnehmer mit Tonbandaufzeichnung und Fotos einverstanden?*
 - *Hinweis auf Datenschutz und Anonymisierung*
- Inhaltliche Regeln:
 - *Keine richtigen oder falschen Antworten*
 - *Bitte gegenseitig ausreden lassen, da sonst Überlagerung auf Tonband*
- Vorstellungsrunde:
 - *Vornamen und Alter nennen*
 - *Warm-up-Frage (knappe Antwort):
„Worauf achten Sie besonders bei Ihrer Ernährung?“*

2. Transitionsphasen (35 Minuten)

8 Minuten

1. Aufgabe (KEINE Diskussion)

- *„Welche **Ereignisse** in den letzten **fünf Jahren** brachten **deutliche Veränderungen** mit sich?“*
- *„Und: **Welche zukünftigen möglichen Veränderungen** in den kommenden fünf Jahren sehen Sie für sich?“*
- Ausfüllen des Arbeitsblattes „verändernde Ereignisse“
- Austeilung durch LL

22 Minuten

2. Aufgabe (11 Minuten):

- *„**Nennung** des wichtigsten **Ereignisses** der letzten fünf Jahre. Notierung auf Flipchart.“*
- Aufschreiben der Nennungen durch LL auf Flipchart
 - *„**Wie lange** wirkten die Veränderungen und hatten Sie einen **direkten Einfluss auf Alltag?**“*

3. Aufgabe (11 Minuten):

- *„Wann hat sich Ihr **Ernährungsverhalten** in den letzten fünf Jahren verändert?“*
 - *„Zeit und Ort“*
 - *„Lebensmittel“*
 - *„Einkaufsort“*
 - *„Welche Marken“*
 - *„Warum kaufen bzw. essen Sie das?“*
 - *„Haben sich Ihre Ernährungsgewohnheiten vielleicht nach einem bestimmten Ereignis in Ihrem Leben verändert?“*

5 Minuten**4. Aufgabe:**

- Austeilung Arbeitsblatt „Ernährungsverhalten“ durch LL; Einsammeln der Arbeitsblätter „Transitionsphasen“ durch LL
- Bearbeitung des Arbeitsblattes „Ernährungsverhalten“

Pause (5 Minuten)

- Einsammeln Arbeitsblätter durch LL und AW
- Austeilung der Produkte durch LL und AW

3. Product handling (65 Minuten)

- Anlass für Produkttestung:
 - *Entwicklung eines neuen Eiweißgetränkes für Senioren*
 - *Berücksichtigung der Vorstellungen der Senioren*
 - *Gewährleistung der Akzeptanz*
 - *Prävention*

10 Minuten**1. Aufgabe:**

- Verkostung der Produkte
- A, B, C nacheinander probieren
- Wasser trinken zwischendurch

25 Minuten (Diskussion jeweils 12,5 Minuten)**2. Aufgabe:**

- *„Wie haben Sie die einzelnen Getränke erlebt?“*
- *„Was sind die jeweiligen **Vor- und Nachteile** für Sie?“*
- *„Was hat Ihnen an dem Produkt am besten/überhaupt nicht gefallen?“*
- *„Was könnte man besser machen?“*

3. Aufgabe:

- *„Wie würden Sie sich so ein Eiweißgetränk **wünschen**?“*
- *„Wie müsste das Getränk sein, damit Sie es kaufen?“*

10 Minuten**4. Aufgabe:**

- Austeilung der Arbeitsblätter „hedonische Prüfung“ durch LL
- Ausfüllen lassen der Arbeitsblätter
- Einsammeln der Arbeitsblätter durch LL

20 Minuten**5. Aufgabe:**

- *„Nennen Sie **Gründe** warum es **nicht sinnvoll/ sinnvoll** ist, so ein Getränk zu kaufen bzw. zu trinken.“*
 - *„Was könnten Motivationen sein?“*
 - *„Was könnten Hemmnisse sein?“*
 - *„Bewertung und Relevanz biologischer Landwirtschaft“*
 - *„Bewertung und Relevanz der Naturbelassenheit (nicht gentechnisch verändert)“*
 - *„Bewertung und Relevanz, dass es unbelastet ist (keine Pestizide, Schadstoffe, Antibiotika)“*
 - *„Bewertung und Relevanz des fairen Handels“*
 - *„Relevanz des Preises“*

4. Abschluss (10 Minuten)**1. Aufgabe:**

- Teilnehmer stellen sich vor: Treff mit Produktentwickler der Eiweißgetränke, **1 Minute** Zeit Wünsche zu äußern
 - *„Was würden Sie dem **Produktentwickler** sagen?“*

2. Aufgabe:

- Bitte um Ausfüllen des letzten Arbeitsblattes zu persönlichen Daten
- Austeilung durch LL
- Einsammeln des Arbeitsblattes durch LL
- Rekrutierung der TeilnehmerInnen für Tiefeninterviews?!
- Bedanken und Verabschiedung der Teilnehmer

Appendix 3: Guideline FG2 (German)

Leitfaden: Fokusgruppe 75+ Jährige

Dauer: 130 Minuten

1. Einführung (15 Minuten)

- Begrüßung
- Vorstellung Institution: siehe Poster an Flipchart
- Kurze Einführung ins Thema:
 - *Im Mittelpunkt steht **Testen von Eiweißgetränken***
 - *Hintergrund: **Eiweißmangel** im Alter häufig auftretendes **Problem** mit negativen Folgen für Gesundheit, z.B. **Verstärkung des altersbedingten Muskelmasseschwundes***
 - ***Vorbeugen bzw. Entgegenwirken** -> Ihr Verhalten und Ihre Meinung sind heute von Bedeutung*
- Anonymität und Fotos:
 - *Sind alle Teilnehmer mit **Tonbandaufzeichnung** und **Fotos** einverstanden?*
- Fotorechte schriftlich einholen durch LL
 - *Hinweis auf **Datenschutz** und **Anonymisierung***
 - *Auf **einheitliches Kürzel** hinweisen*
- Inhaltliche Regeln:
 - *Keine richtigen oder falschen Antworten -> Meinung zählt*
- Vorstellungsrunde:
 - *Kurze Vorstellung der Person*
 - *Warm-up-Frage (knappe Antwort):*
 - *„Worauf **achten** Sie **besonders** bei Ihrer **Ernährung**?“*

2. Motive + Gesundheitsverständnis (45 Minuten)

10 Minuten

1. Aufgabe (Bearbeitung Arbeitsbogen)

- *„Was **beeinflusst** Sie beim **Kauf** Ihres Essens?“*

35 Minuten

2. Aufgabe (Aufgabe + Diskussion á 17,5 Minuten):

- Diskussion „Einfluss“: Notieren der Stichpunkte auf Kärtchen, Anbringung an Flipchart durch LL, Diskussion
 - *„Was **ist Ihnen** bei der **Wahl gesunder Lebensmittel** besonders wichtig?“*
 - *„Erkennen Sie sich bei den Stichpunkten der anderen wieder?“*
 - *„Wir sehen hier XY, was ist Ihre Meinung dazu?“*
- Diskussion „Gesundheit“: Notizen an Flipchart durch LL
 - *Was verstehen Sie unter „**Gesundheit**“?*

3. Vorbereitung Product handling (5 Minuten)

- Austeilung der Produkte durch LL
- Anlass für Produkttestung:
 - ***Entwicklung** eines neuen **Eiweißgetränkes** für Senioren*
 - *Berücksichtigung der **Vorstellungen** der Senioren*
 - *Gewährleistung der **Akzeptanz***

3. Product handling (30 Minuten)

5 Minuten

3. Aufgabe (Verkostung):

- Verkostung der Produkte
- A, B, C nacheinander probieren, Wasser trinken zwischendurch

15 Minuten

4. Aufgabe (Diskussion 8 Minuten) :

- „Wie haben Sie die **einzelnen Getränke** erlebt?“
- „Was sind die jeweiligen **Vor- und Nachteile** für Sie?“
- „Was hat Ihnen an dem Produkt am besten/überhaupt nicht gefallen?“

5. Aufgabe (Diskussion 7 Minuten):

- „Was muss **das Produkt** insgesamt beinhalten und erkennen lassen, damit es Sie **überzeugt**?“
- „Wie würden Sie sich so ein Eiweißgetränk **wünschen**?“

10 Minuten

6. Aufgabe (Bearbeitung Arbeitsblatt):

- Austeilung der Arbeitsblätter „hedonische Prüfung“ durch LL
- Ausfüllen lassen der Arbeitsblätter
- Einsammeln der Arbeitsblätter durch LL

4. Transitionsphasen (25 Minuten)

10 Minuten

1. Aufgabe (Bearbeitung Arbeitsblatt):

- „Welche **Ereignisse** in ihrem Leben brachten **deutliche Veränderungen** mit sich?“
- „Und: Welche **zukünftigen möglichen Veränderungen** sehen Sie für sich?“
- Austeilung des Arbeitsblattes „verändernde Ereignisse“ durch LL
- Bearbeitung des Arbeitsblattes „verändernde Ereignisse“

10 Minuten

2. Aufgabe (Diskussion):

- „**Wie lange** wirkten die Veränderungen und hatten Sie einen **direkten Einfluss auf Ihren Alltag**?“

5 Minuten

4. Aufgabe (Bearbeitung Arbeitsblatt):

- Austeilung Arbeitsblatt „Ernährungsverhalten“ durch LL; Einsammeln der Arbeitsblätter „Transitionsphasen“ durch LL
- Bearbeitung des Arbeitsblattes „Ernährungsverhalten“

4. Abschluss (10 Minuten)

1. Aufgabe (Redebeitrag 5 Minuten):

- Teilnehmer stellen sich vor: Treff mit ProduktentwicklerIn der Eiweißgetränke, **eine halbe Minute** Zeit Verbesserungsvorschläge zu äußern
 - „Was würden Sie dem/ der **ProduktentwicklerIn** zur Verbesserung vorschlagen?“

2. Aufgabe (Bearbeitung Arbeitsblatt 5 Minuten):

- Austeilung des Arbeitsblattes zu persönlichen Daten durch LL
- Bitte um Ausfüllen des Arbeitsblattes zu persönlichen Daten
- Einsammeln des Arbeitsblattes durch LL
- Rekrutierung der TeilnehmerInnen für Tiefeninterviews?!
- Bedanken und verabschieden der Teilnehmer

Appendix 4: Guideline FG3 (German)

Leitfaden: Fokusgruppe 75+ Jährige

Dauer: 130 Minuten

1. Einführung (20 Minuten)

- Begrüßung
- Vorstellung Institution: siehe Poster an Flipchart
- Kurze Einführung ins Thema:
 - *Im Mittelpunkt steht **Testen von Eiweißgetränken***
 - *Hintergrund: **Eiweißmangel** im Alter häufig auftretendes **Problem** mit negativen Folgen für Gesundheit, z.B. **Verstärkung des altersbedingten Muskelmasseschwundes***
 - ***Vorbeugen bzw. Entgegenwirken** -> Ihr Verhalten und Ihre Meinung sind heute von Bedeutung*
- Anonymität und Fotos:
 - *Sind alle Teilnehmer mit **Tonbandaufzeichnung und Fotos** einverstanden?*
- Fotorechte schriftlich einholen durch LL
 - *Hinweis auf **Datenschutz und Anonymisierung***
 - *Auf **einheitliches Kürzel** hinweisen*
- Inhaltliche Regeln:
 - *Keine richtigen oder falschen Antworten -> Meinung zählt*
- Vorstellungsrunde:
 - *Kurze Vorstellung der Person*
 - *Warm-up-Frage (knappe Antwort):*
 - *„Worauf **achten** Sie **besonders** bei Ihrer **Ernährung**?“*

2. Motive + Gesundheitsverständnis (35 Minuten)

5 Minuten

1. Aufgabe (Bearbeitung Arbeitsbogen):

- *„Was **beeinflusst** Sie beim **Kauf** Ihres Essens?“*

20 Minuten

2. Aufgabe (Aufgabe + Diskussion):

- Diskussion „Einfluss“: Notieren der Stichpunkte auf Kärtchen, Anbringung an Flipchart durch LL, Diskussion
 - *„Was **ist Ihnen** bei der **Wahl gesunder Lebensmittel** besonders wichtig (und warum)?“*
 - *„Erkennen Sie sich bei den Stichpunkten der anderen wieder?“*
 - *„Wir sehen hier XY, was ist Ihre Meinung dazu?“*

10 Minuten

3. Aufgabe (Diskussion):

- *Was verstehen Sie unter „**Gesundheit**“?*
 - *„Was bedeutet Gesundheit für Sie ganz persönlich?“*

3. Vorbereitung Product handling (5 Minuten)

5 Minuten

- Austeilung der Produkte durch LL
- Anlass für Produkttestung:
 - ***Entwicklung** eines neuen **Eiweißgetränkes** für Senioren*
 - *Berücksichtigung der **Vorstellungen** der Senioren*
 - *Gewährleistung der **Akzeptanz***

4. Product handling (30 Minuten)

5 Minuten

- **1. Aufgabe (Verkostung):**
- Verkostung der Produkte
- A, B, C nacheinander probieren, Wasser trinken zwischendurch

15 Minuten

2. Aufgabe (Diskussion):

- „Wie haben Sie die einzelnen **Getränke erlebt?**“
- „Was sind die jeweiligen **Vor- und Nachteile** für Sie?“
 - „Was hat Ihnen an dem Produkt am besten/überhaupt nicht gefallen?“

10 Minuten

6. Aufgabe (Bearbeitung Arbeitsblatt):

- Austeilung der Arbeitsblätter „hedonische Prüfung“ durch LL
- Ausfüllen lassen der Arbeitsblätter
- Einsammeln der Arbeitsblätter durch LL

5. Wünsche + Präferenzen hinsichtlich Produktart (30 Minuten)

4 Minuten

1. Aufgabe (Diskussion):

- „Wenn Sie frei entscheiden könnten: Welche **Produktart** würden Sie sich für so ein eiweißangereichertes Produkt am ehesten **wünschen?**“

8 Minuten

2. Aufgabe (Diskussion):

- „Wie hoch ist Ihr grundsätzliches **Interesse an Milchprodukten?**“
 - „Wie oft konsumieren Sie z.B. **Joghurtprodukte?**“
- „Würden Sie ein **Joghurtgetränk** einem Proteindrink gegenüber **bevorzugen?**“

4 Minuten

3. Aufgabe (Diskussion):

- „Wie sieht Ihrer Meinung nach eine **angemessene Kommunikation** über ein proteinangereichertes Produkt aus?“
 - „Welche Informationen wünschen Sie sich dazu?“

4 Minuten

4. Aufgabe (Erläuterung):

- Gewünschte **Anwendungsmöglichkeiten** erfragen und Konsummomente aufzeigen, Beispiel: zum Frühstück

5 Minuten

3. Aufgabe (Diskussion):

- „**Was muss das Produkt** insgesamt beinhalten und erkennen lassen, damit es Sie **überzeugt?**“
- „Ist so ein Produkt überhaupt erwünscht?“

6. Abschluss (10 Minuten)

1. Aufgabe (Bearbeitung Arbeitsblatt):

- Austeilung des Arbeitsblattes zu persönlichen Daten durch LL
- Bitte um Ausfüllen des Arbeitsblattes zu persönlichen Daten
- Einsammeln des Arbeitsblattes durch LL
- Rekrutierung der TeilnehmerInnen für Tiefeninterviews?!
- Bedanken und verabschieden der Teilnehmer

Appendix 5: Guideline problem-centred interviews (German)

Leitfaden Problemzentriertes Interview

Dauer: 100 Minuten

1. Einführung (10mins)

- Begrüßung
- Kurze Einführung ins Thema:
 - Ernährungsverhalten:
 - Promotionsthema „Ernährung“ und warum sich Menschen wie ernähren
 - Nach wie vor viele Unklarheiten auf diesem Gebiet
 - Zusammenführung unterschiedlicher Methoden
 - Deswegen evtl. Unverständnis gegenüber bestimmter Fragen/Methoden; dennoch ausgearbeitet Konzept vorhanden
- Keine richtig oder falschen Antwort; Meinung, Individualität, Empfindungen interessieren
- Anonymisierung der Daten
- Tonbandaufnahme in Ordnung? (Einschalten ab 3.)
 - Warum mache ich das
- Ablauf

2. Operante Motiv-Test (30mins)

- „Ich gebe Ihnen nun einen Bogen mit insgesamt 15 verschiedenen Bildern. Jede Bildsituation soll eine alltägliche **Lebenssituation** darstellen. Bitte sehen Sie sich jedes Bild zunächst genau an und überlegen Sie sich dann eine kurze **Geschichte** oder eine **Szene**, die die dargestellte Situation näher beschreibt. Der Inhalt der Geschichte bleibt ganz Ihnen überlassen; es gibt keine richtigen oder falschen Geschichten. Lassen Sie Ihrer **Phantasie** freien Lauf, die Originalität der Geschichte spielt *keine* Rolle. Eine der Personen auf dem Bild soll darin die Hauptrolle spielen; kennzeichnen Sie diese Person bitte mit einem **Kreuz**. Sie müssen Ihre Geschichte nicht ausführlich aufschreiben, sondern nur jeweils die drei Fragen, die Sie neben jedem Bild finden und die sich auf die Hauptperson beziehen, beantworten.
Beginnen Sie bitte mit Bild 1 und gehen Sie dann der Reihe nach vor.“

3. Interview und 24 Stunden Recall (40mins)

- Aufgabenstellung Ernährung eines Wochentages (gestern) sowie eines Sonntages mittels Bilderkarten darstellen (Fotos machen!!)
 - „Zunächst möchte ich Sie bitten anhand dieser Karten, die verschiedene Lebensmittel oder Lebensmittelgruppen darstellen, Ihren gestrigen Ernährungstag zusammenstellen. Das heißt, Sie suchen sich aus den Karten einmal die Zutaten Ihres Frühstück, Ihres Mittagessen und Ihres Abendessen raus und legen sie entsprechend der Mahlzeit in Gruppen zusammen. Ich möchte Sie auch bitten, während Sie sich die Karten raussuchen, zu erzählen, was Sie im Einzelnen gegessen haben und was das für eine Situation war und wie Sie sich dabei gefühlt haben. Ich werde Ihnen darüber hinaus noch weitere Fragen stellen. Wenn wir mit dem gestrigen Tag fertig sind, möchte ich Sie bitten, dass Sie dasselbe noch einmal für den vergangenen Sonntag machen. Abschließend werde ich noch Fotos von den beiden Tagen machen.“
- Legung des gestrigen Wochentages:
 - Welche Art von Lebensmitteln bevorzugen und kaufen Sie (TK, frisch, vorverarbeitet, Fertigprodukte)?
 - War der gestrige Ernährungstag typisch?
 - *Haben Sie selbst gekocht?*

- Kochen Sie gerne? Viel?
- Wieviel Zeit nehmen Sie sich für das Kochen?
- Beschreiben Sie bitte, wie die Situation des Essens im Einzelnen aussieht.
 - Essen alle zusammen?
 - Läuft der Fernseher
 - Wird geredet?
- Wie häufig kommt es vor, dass Sie zwischen den Mahlzeiten etwas/Kleinigkeiten essen?
 - Was sind das für Situationen, in denen das vorkommt?
 - Welche Lebensmittel essen Sie in solchen Situationen meist?
- Wie hungrig sind Sie (entsprechend) zu den Hauptmahlzeiten?
- Beschreiben Sie die Rolle, die Essen in Ihrem Alltag einnimmt.
- Wie häufig kommt es vor, dass Sie über Ihre Ernährung bzw. das Thema Essen nachdenken?
 - Wie fühlen Sie sich damit?
 - Würden Sie sich gerne mehr/weniger mit Ihrem Essen beschäftigen?
- Welche Emotionen verbinden Sie mit Essen?
 - Wie würden Sie Ihr Verhältnis zum Essen beschreiben? Entspannt/unentspannt? Warum?
- Macht es einen Unterschied, ob Sie alleine oder in Gesellschaft essen?
 - Wie wirkt sich der Unterschied aus?
- Kennen Sie so etwas wie innere Zerrissenheit/Ambivalenz in Bezug auf Essen?

4. Ernährungsfragebogen und Personality Research Form (15mins)

- Beantwortung des Fragebogens

5. Abschluss teil (5mins)

- Zusammenfassung/ Abschluss formulieren
- Bedanken, Aushändigen des Incentives und Verabschieden der Teilnehmer

Appendix 6: Publication I



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Protein for Community-Dwelling Older People: Aspects That Influence the Perception of Commercially Available Protein Drinks

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In an aging population, support for independent living is increasingly critical for older generations. Currently, sarcopenia is a major cause of frailty, which increases the risk of decreased mobility, falls, morbidity, and mortality and leads to dependence on third parties. Sarcopenia is preventable by consumption of adequate protein. However, many older people do not meet the recommended daily allowance of protein, thereby supporting dependence rather than independent living. Current literature indicates that a protein drink could be an appropriate product for older peoples' protein consumption. We were interested in autonomous persons whose nutritional decisions were still self-determined and thus could preventively influence their personal health. This study evaluated three commercially available protein drinks in three focus groups ($n=25$) to gain insight into which aspects influence the perception of commercial protein drinks on community-dwelling older people (age, 76.8 ± 4.9). Findings from the focus groups revealed only aspects, which influenced the perception of commercial protein drinks negatively. Most importantly, the drinks did not comply with relevant aspects when buying (healthy) foods, which were naturalness, freshness, locally grown ingredients, and trust. Furthermore, the target group did not see a need for additional protein consumption. Thus, we identify important aspects to be considered for the development of a target-group-specific protein drink as well as more suitable communication to prevent distrust in order to support independent living for community-dwelling older people.

Keywords: perception, protein, older people, focus groups, enable cluster

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INTRODUCTION

In an aging population, maintaining physical function and mobility as well as enabling independent living is highly important for older people aged 65 years or more (1, 2). An essential factor as to why older people cannot live independently is the age-related loss of muscle mass, muscle strength, and function, called sarcopenia. Sarcopenia is a major cause of frailty in the elderly and increases the risk of mobility limitations, falls, morbidity, and mortality (3–5). One identified risk

factor of sarcopenia is low protein intake (6). Large prospective cohort studies provided evidence that a high dietary protein intake is associated with a reduction in the decline of muscle mass, strength, and function in older people (6–8). However, many older people do not meet the recommended daily intake of 0.8 g protein/kg of body weight per day (6, 9–11). Additionally, there is growing evidence that older people even have higher protein requirements of 1.0–1.2 g/kg of body weight per day in order to maintain muscle mass and function (1, 12, 13).

Within this study, we were especially interested in autonomous persons, whose decisions were still self-determined. Therefore, we argue in favor of a product that has preventive characteristics and can be readily implemented in the diet of older people before they suffer from frailty to support their independent lifestyle as long as possible.

Currently, no adequate strategy seems to exist to guarantee an appropriate amount of protein intake in community-dwelling older people, which fulfills the needs of this specific target group.

Best et al. (14) analyzed the reasons for a low consumption of high-protein foods in older people and identified dental disabilities, reduction in chemosensory and physical abilities, and changes in the living situation, such as becoming a widow, as reasons for the low consumption. The ability to chew and swallow products such as meat and nuts became difficult, and individuals lacked the desire to purchase and cook food for just one person (14). Recent literature indicated that older people (>65) are only partially interested in cooking: only 72% enjoy cooking (15). Nevertheless, another study from Germany identified that 98% of independently living older people (>65) regularly eat three meals per day (16). Tieland et al. (17) examined the dietary protein intake of Dutch older people (average age, 78.6 years) and concluded that beverages were among the top five dietary protein sources of snacks but only contributed to 20% of the daily protein intake (17).

van der Zanden et al. (18, 19) found that—despite a general skepticism toward potential protein-enriched functional foods (18, 19)—dairy products were one of the best alternatives for protein-enriched foods for consumers aged 55+ (18). However, in another study, this research group showed that older people preferred to get their protein via traditional meals (19). van der Zanden et al. (18) recommend developing a tasty and healthy protein-enriched food in order to support the health status of older people (18).

Thus, we concluded that the daily consumption of ready-to-consume protein drinks could be an option to increase protein intake in older people and therefore support independent living. Since the drinks must neither be cooked nor chewed, including dairy protein and as a beverage are meal part for regular meal situations. Such a protein drink does not yet exist on the German food market. The existing protein-rich drinks that meet the recommended minimum amount of 8 g protein per 100 ml (20) are either offered in the form of medical nutrition products for malnourished patients [oral nutritional supplements (ONS)] or advertised as nutritional supplements for athletes.

Additionally, new or improved nutritional products (21) have partially flop rates of 30–90% (22). These high flop rates can be attributed to unmet needs of the target group; consumers should be involved in product development or modification (22, 23).

We were especially interested in autonomous relatively fit community-dwelling older persons, whose decisions were still self-determined in order to be able to preventively influence the health status of the target group. Since protein drinks are rich in protein, they could be a means of increasing protein intake and thus preventing sarcopenia and support independent living of this target group. Literature indicates that a liquid drink for the older population might be an adequate product type (14, 17), as older people can have problems chewing and furthermore do not like cooking regularly, for reasons such

as being widowed. The drink should not require any cooking and should include dairy protein and be a beverage and therefore a traditional meal-part for regular meal situations.

Thus, the aim of this study was to gain insight into the aspects, which influence the perception of commercial protein drinks with at least 8 g of protein per 100 ml from community-dwelling older people to understand their needs and find an adequate method for appropriate protein intake at this stage. For this purpose, we asked the participants of the focus groups about general aspects of buying and consuming healthy foods and the importance of such foods for one's own diet in order to better understand how a health-promoting product, such as the protein drink, should be designed to meet the perceived criteria of a healthy food of our target group.

The results of the analysis can be used to develop a protein-rich product, which is suitable for community-dwelling older people, who can—with the help of that product—live independently as long as possible.

In this study, we understand the term *perception* as a process of information processing, through which absorbed environmental stimuli (information intake) is decoded and interpreted. In combination with other information, the processing ends up in subjective internal pictures (24).

MATERIALS AND METHODS Procedure

In order to pursue our target, three focus groups ($n = 25$) were performed using a semistructured interview guideline; requests by the interviewer were always possible. In all focus groups, participants sat around a table in a separate room with the facilitator, who guided the focus groups; an assistant, who supported the facilitator with the organization during the focus groups; and the secretary, who recorded the focus groups. The facilitator was not es-

pecially trained for the focus groups but is experienced in moderating different types of group discussions. The focus groups lasted between 2 and 2.5 h and were conducted without interruption. The focus groups were audiotaped, whereby all of the participants gave informed consent.

At the beginning of each focus group, participants received a short introduction about the protein consumption needs of older people. Afterwards, participants introduced themselves and answered a brief warm-up question about what is important to them in regard to their nutrition. Due to organizational reasons and the experience from the first focus group, the interview guideline was slightly modified after the first session to better fulfill the expectations of the focus groups.

The first focus group ($n = 7$) continued with a 5- to 10-min product handling phase of the protein drinks. During the product handling phase, three different conventional protein drinks (sport drinks and ONS) were tested in all three focus groups. First, each participant received ~100 ml of each drink with refills available. The protein drinks were handed out in plastic cups, so participants could see the drinks but could not identify them. During the product handling phase, participants were requested not to talk about their impressions of the drinks with other participants. Product handling was followed by a discussion of the advantages, disadvantages, and potential wishes for the drinks. Afterward, participants had to fill in a questionnaire about the hedonic perception of the drinks. Then, participants had to name reasons why it was meaningful or not meaningful to consume the drinks. The focus group was completed with a 1-min statement by each participant, concluding their most important considerations with regard to the protein drinks.

After the introduction, the second and third focus group ($n = 18$) proceeded with a discussion about the main influencing factors when choosing healthy groceries. Participants were asked to individually write down all relevant influencing factors on cards.

Subsequently, the answers were pinned on a flip-chart and discussed with the group. In the follow-up question, the general understanding of the term “health” was discussed. These questions were asked to understand the nutritional context of the participants, their behavior, interest, and thinking in relation to nutrition and health and to link this information to the perception of commercial protein drinks by the older people in the focus groups.

Then, the second and third focus group continued with the product handling phase, in which participants were asked to answer the hedonic questionnaires (see above). This was followed by a discussion of the sensory advantages and disadvantages of the three tested protein drinks and the general necessity and adequacy of such a drink from the participants’ point of view. Additionally, participants were asked to describe how their ideal protein drinks should be. They ended with presenting their 1-min statement.

Finally, all except one participant ($n = 24$) filled in a questionnaire about sociodemographic characteristics and their subjective health.

Since the participants of the third focus group reiterated the opinions, explanations, and arguments stated in focus group 1 and 2, saturation was reached. Thus, we did not conduct a fourth focus group.

Participants

In total, 25 persons aged 75+ participated in the focus groups, consisting of seven to nine participants each. We recruited independently living older people with similar living conditions from three different locations.

The first focus group was carried out in an assisted living home for older people in the City of Straubing, where the participants live independently, having full charge of grocery shopping. Participants were recruited by the staff of the assisted living home and the first author. The second focus group was con-

ducted with independently living people in Nuremberg at the Institute for Biomedicine of Aging, where participants were contacted by the second author based on an address list of participants from previous studies. The third focus group was held in a gym in the City of Straubing with independently living older people, recruited by the staff of the gym.

For all three focus groups, the only criterion for inclusion was an age of at least 75 years. The reason for this age limit is the fact that people at high risk (75+) are generally more likely to experience a negative trend, so the need for prevention is the most pressing in this age group. However, three people were allowed to participate, although they did not meet this criterion (age 67, 68, 74).

Materials

Questionnaires

In the hedonic questionnaire, participants had to answer questions about the overall opinion of the taste, the aroma, the characterization of the aroma (e.g., salty, soft, fruity...), the degree of sweetness, the intensity of the flavor, the texture, and the characterization of the texture (e.g., highly fluid, viscous...) for each drink. Participants were also asked to indicate an overall score for each drink, to state how much of the particular drink they would consume per day and how much they would be willing to pay for each drink. The questionnaire was in the form of a 5-point Likert scale with the answer options “very...,” “quite...,” “mediocre...,” “not...,” and “not at all...” With regard to the characterization of the texture, participants were asked to tick one answer out of seven possibilities, which were thin, viscous, semifluid, creamy, sticky, slimy, and greasy. When asked about the characterization of the aroma, participants were allowed to tick more than one of the 14 offered options. Thus, the latter question meets the criteria of check-all-that-apply (CATA) questions. Per to Ares et al. (25) it is important to consider some rules for these kinds of

questions. Hence, we decided not to structure the answer options in alphabetical order as well as to use separate questions with few terms. We also instructed the participants to finish product handling first and then to answer the questionnaire in order to get an overall impression of the different drinks (25, 26).

The sociodemographic questionnaire contained questions about sociodemographic data, the subjective importance of healthy nutrition, the interest in information about nutrition, as well as questions about the personal estimation of each participants' self-description of their objective health absolutely and in comparison, to other older people. For the health-related questions, a 4- or 3-point Likert-like scale was applied. One participant did not answer the sociodemographic questionnaire.

Protein Drinks

We decided to test only three protein drinks, since the duration of the focus groups, especially for the age of the target group, already took a long time and we did not want to overstress the participants and thus compromise the validity of our results.

For product handling, participants received three different conventional protein drinks, which were purchased on the Internet or in grocery stores. For the choice of the tested commercially available protein drinks, three selection criteria

TABLE 1 | Detailed information about tested protein drinks.

Nutrition facts	Protein Drink A per 100 ml	Protein Drink B per 100 ml	Protein Drink C per 100 ml
Type of drink	Sport drink	ONS	Sport drink
Flavor	Raspberry and Blueberry	Multifruit	Strawberry
Protein type	Whey protein concentrate or isolate	Milk protein	Skimmed milk concentrate
Energy	231 kJ/55 kcal	630 kJ/150 kcal	255 kJ/61 kcal
Fat	0.7 g	6.7 g	0.1 g
Saturated fat	0.5 g	0.6 g	0.1 g
Carbohydrates	4.1 g	12.4 g	4.9 g
Sugars	3.5 g	7.1 g	4.8 g
Protein Content	8.0 g	10.0 g	10.0 g

were applied. First, the protein drinks had to have at least the recommended minimum amount of 8 g

protein per 100 ml. Second, they should derive from a similar flavor. It was decided to hand out drinks with fruit flavor, since fruits are associated with health. The third selection criteria referred to the type of products, which had to comply with different product types from the main classes sport drinks and ONS, as these two types comply with the nutritional demands and are commercially available; to reveal the potential differences in perception. Furthermore, both categories were low volume and contained a high amount of protein. Further details concerning the nutrient content of the tested protein drinks are given in **Table 1**.

Two of the protein drinks were sport drinks (flavor: raspberry and blueberry = drink A; strawberry = drink C), while the third was an ONS (flavor: multifruit = drink B) fortified with omega 3 fatty acids.

Data Analysis

The focus groups were audiotaped and transcribed verbatim. Qualitative content analysis in the form of a summary, as described by Philipp (27) was applied by the first author to analyze the data (27). The analysis is based on those parts of the focus groups, which dealt with the general health issues and the product handling phase with its subsequent discussion. According to Mayring (27) and in order to reveal the central themes of the qualitatively collected data and to summarize them, there are three steps to go through, namely, paraphrasing, generalization, and reduction; the latter can be run through several times (27). In our study, we went through the reduction phase twice in order to filter out the actual consensus on the main issues and reduce it to the essentials. By applying this procedure, one moves away from the actual statements of each individual, and the consensus in the group discussions was summarized. The results of this procedure are described in *Results* and reveal, among other things, essential criteria that are important for the target group when buying healthy food. These aspects are

linked to the protein drinks, as these are also supposed to be a health-promoting food. Hedonic and sociodemographic data were analyzed using IBM SPSS Statistics 23.

TABLE 2 | Characterization of the participants I.

Topic	N	Categories	
		Vocational training	University degree
Highest degree of educational qualification			
Female	14	7	4
Male	10	7	3
Total	24*	14	7
Household size			
		One-person household	Two-person household
Female	14	9	5
Male	10	3	7
Total	24*	12	12
BMI			
		Minimum	Maximum
Female (average: 25.8)	13	18.3	31.2
Male (average: 27.7)	10	22.2	37.1
Total	23**		

Source: own data set and calculations.

*One participant did not answer the socioeconomic questionnaire.

**Two missing answers.

RESULTS

We will present the results of the focus groups in a logical structure. Thus, they are not ordered in the same way as the questions were asked during the focus groups. We will use quotations to demonstrate and underpin our results and interpretations. It can be noted, however, that the answers of the participants were generally fairly consistent among the three focus groups.

Characterization of the Participants

In total, 14 women and 11 men (age, 78.6 years \pm 4.9; body mass index (BMI), 26.6 \pm 4.2) participated in the focus groups (see **Table 2**). One participant did not answer the socioeconomic questionnaire.

The highest degree of educational qualification of most of the participants was either vocational training or a university degree: 14 persons had some kind of vocational training (vocational training or master craftsmen), whereas seven persons had different kinds of university degrees (polytechnic degree, university degree or doctoral degree). Three persons indicated to have another educational qualification. There were two different types of living situations present in the focus groups, either 12 persons who lived alone (mostly because they were widowed) or those 12 participants who lived with their partners. According to the World Health Organization (WHO), there are three different weight statuses adults can have: adults of normal weight (≥ 18.5 kg/m²), pre-obese adults (≥ 25 kg/m), and adults who are obese (≥ 30 kg/m²) (28). As shown in **Table 2**, the participants of our focus groups had a BMI between 18.3 and 37.1

TABLE 3 | Characterization of the participants II.

Topic	N	Categories			
		Bad	Good	Very good	
Subjective health					
Female	14	0	13	1	
Male	10	1	8	1	
Total	24*	1	21	2	
Importance of a balanced nutrition for well-being in old age					
		Less important	Important	Very important	
Female	14	0	5	9	
Male	10	1	4	5	
Total	24*	1	9	14	
Interest in nutritional information					
		Not at all	Not	Strong	Very strong
Female	14	0	1	8	5
Male	10	1	2	7	0
Total	24*	1	3	15	5

Source: own data set and calculations.

*One participant did not answer the socioeconomic questionnaire.

kg/m², with eight persons being people of normal weight, nine people were preobese, and six persons were obese.

As shown in **Table 3**, 23 participants rated their subjective health as “good” or “very good” and only one person answered that question with “bad.”

In addition, 23 participants found that a balanced nutrition is “very important” or “important” for well-being in old age. One found nutrition a “less important” factor for well-being.

Finally, five participants of the focus groups were very strongly interested in nutritional information, 15 participants showed strong interest in such information, three participants answered that they were not interested, and one participant showed no interest at all in information on nutrition.

Perception of the Protein Drinks

In the following, the aspects that influenced the perception of the protein drinks during the focus groups will be presented.

Distrust Toward the Modern Food Industry and Dietary Recommendations

The first aspect we found that influenced the perception of the protein drinks was that most of the participants were considerably skeptical about the food industry and new types of food products in general. Apparently, this issue was highly sensitive, as this comment emphasizes:

“We live in a society of profit and everyone tries to bring as much as possible on the market.”

Not only skepticism but also confusion and uncertainty about dietary recommendations played an important role for the distrust in the modern food industry.

One person stated:

“Sometimes coffee is harmful, sometimes it is not.”

Then another person said:

“You should not eat too much butter. Others say you should eat it.”

These statements pointed out that certain skepticism about the modern food industry and its products persists within this age group. In addition, the statements illustrated the uncertainty and confusion the participants encountered with regard to current

dietary recommendations. Together, these aspects have negatively influenced the perception of the commercial protein drinks, given that they were perceived as being rather modern and coming hand in hand with a dietary recommendation.

Important Aspects When Buying (Healthy) Foods

We asked participants ($n = 18$) what was important to them when choosing healthy foods. The participants attached high importance to four aspects: groceries must be natural, the ingredients must be grown locally, vegetables and fruits must be fresh and the manufacturer must be trustworthy. These aspects were not only important for healthy foods, but generally when choosing food products. For example, one older person stated:

“When I see teenagers and I see their shopping baskets, what they buy is a horror to me: ready roasted fried potatoes and, and, and.”

This statement of an old person highlighted the importance of the naturalness and freshness aspects. Even in the first focus group, where we did not explicitly ask these questions, we learned about the importance of natural ingredients:

B1: “So natural raw materials would be more important to me.”

Interviewer: “Yes.”

B2: “Yeah, let’s agree to eat something healthy, right?” B3:

“Yes.” (Several agree)

With regard to the origin of the food product, one subject said:

“Well, if I have a choice, from the region.”

An additional important role was the factor of trust, as we already realized when participants talked about the food industry. The following example pointed out this aspect especially with regard to its own nutrition.

“We have a rural butcher, whom I trust completely.”

These outlined statements illustrated that for older people, aspects such as naturalness, freshness, locally grown ingredients, and trust played an important role when buying (healthy) foods, and they were of prominent relevance for the general perception of food products.

General Lack of Knowledge Concerning Protein and Special Protein Requirements

Another result we found that influenced the perception of the commercial protein drinks was that nearly all of the participants lacked a general knowledge about protein and its function in their body, as the following example illustrated:

“And when he says you lack...” Interviewer: “...protein.” Older person: “...what is there inside?”

Additionally, the persons who showed a lack of knowledge about protein also did not know about the daily protein requirements in old age. A person asked for example:

“May I ask what the health benefit of this product should be?”

In general, the emphasized statements from the different focus groups showed that the older people neither knew for themselves about the physiological function of protein nor about the need for additional protein consumption at their age group despite the probable changes that come with age, such as the loss of muscle mass. This aspect additionally influenced the perception of the commercially available protein drinks, since the participants questioned the need of protein drinks in general.

Perceived Lack of Necessity to Supplement Protein
Even after giving the participants information about their special protein requirement, they did not see the necessity of consuming additional protein. One individual mentioned:

“I think my food is already full enough with proteins. I don’t need an additional one.”

One explanation for this opinion might be the subjective health status of the participating persons (see **Table 2**). In line with that, participants did not see a need for protein supplementation due to their current, healthy lifestyle, and diet. Thus, participants could not identify any benefit a protein drink could offer them. They felt that their current diet and lifestyle was covering all their nutritional needs. In contrast, there was only one participant who knew sufficiently about the need to consume additional protein.

“But I heard about everything you can do with such proteins [powder] that tastes good. As an older person myself I had to get more information about this.”

The majority of the participants did not see the necessity of supplementary protein due to their subjective health status even after giving them information on that topic, and their request for doctoral diagnosis revealed the skepticism about special protein requirements and the need to additionally consume protein-rich food or drinks.

Evaluation of the Protein Drinks

As shown in **Figure 1**, the selected protein drinks were all rated as rather sweet and not natural. Moreover, only Product A was not perceived as artificial, the evaluation of Product B was relatively balanced in this regard, whereby Product C was rated as being artificial by 22 participants.

The following statement showed the importance of natural products for this age group especially with regard to the commercial protein drinks:

“Too spurious, too perfumed, too artificial.” An-

other participant stated:

“Well, for me all of them are too sweet, way too sweet.”

Being asked, whether or not the product would be interesting for the target group, one individual pointed out:

“No, because it has to be a pleasure to drink it.”

This quotation illustrated that none of the drinks met the pleasure aspect in the consumers’ point of view.

Altogether, the “favorite” protein drink was the raspberry and blueberry flavored sports drink (Product A) (see **Figure 2**). The drink was rated as “fresh” and “fruity” and had a sweet-sour component, which most of the participants liked. The medical nutritional supplement with the flavor of multifruit (Product B) is the second most preferred. However, this drink also polarized the most, whereas the other two analyzed drinks were highly strong and clear in perception (**Figure 2**). None of the participants liked the sport drink with taste of strawberry (Product C): it was rated as too artificial and was far too sweet according to the respondents.

With regard to the texture, the participants agreed that this feature of the protein drinks did not vary substantially across the different products. Protein drink A was perceived by 11 people as thin, by seven as creamy, by four as semifluid, and by the rest other perception of consistencies occurred. Protein drink B received six votes for thin, 14 votes for creamy, and the rest were distributed among other perceptions of consistency. Finally, the participants perceived protein drink C 15 times as thin and 5 times as creamy; the rest of the votes were distributed to other consistencies.

The results of product handling of all three focus groups showed that, with regard to liking the drinks, the identified four important aspects: naturalness, freshness, locally grown ingredients, and trust when

buying (healthy) food products mattered for the evaluation of the commercially available protein drinks.

Overall, the tested protein drinks were not pleasurable for the participants to consume. They were too sweet, too unnatural, and too unhealthy. They would only buy or consume the drinks if they meet the described important aspects of buying (healthy) food products, namely, naturalness, freshness, locally grown ingredients, and trust.

Protein Drinks Cannot Be Integrated in Daily Nutrition

Another aspect that influenced the perception of the protein drinks was that the participants could barely imagine how

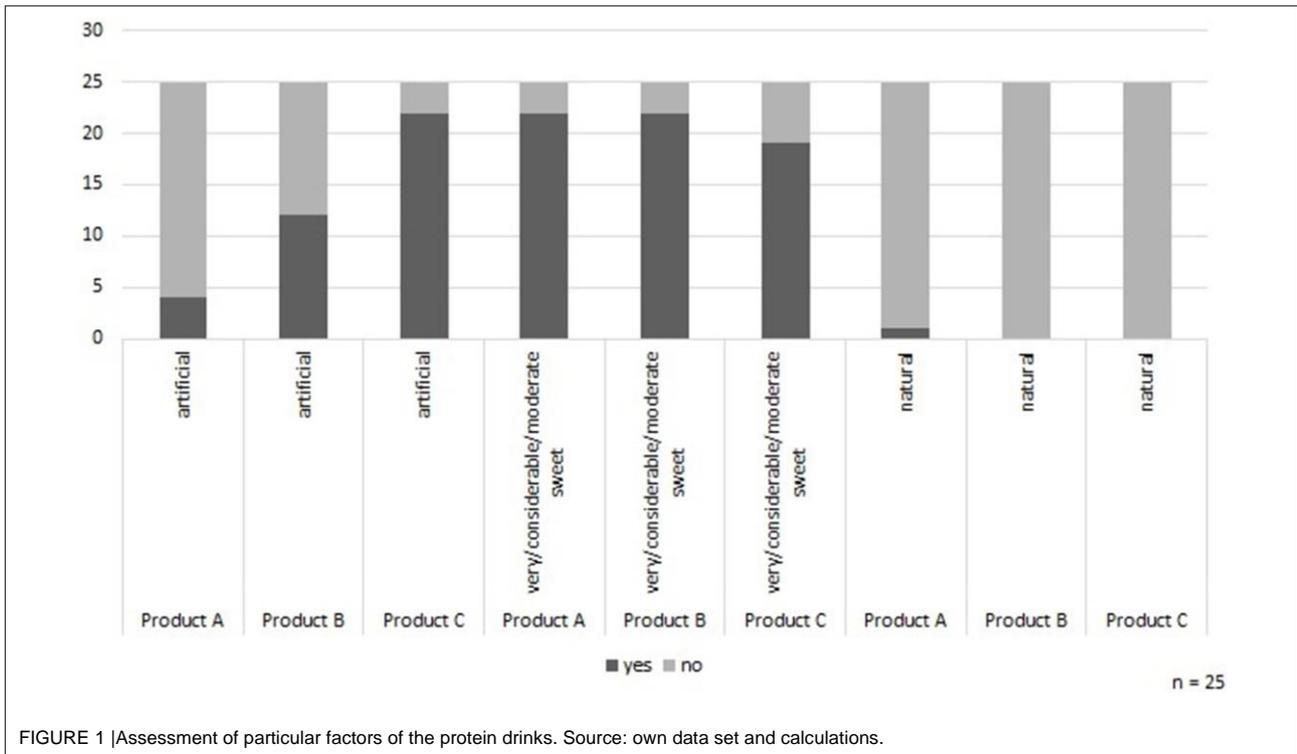


FIGURE 1 |Assessment of particular factors of the protein drinks. Source: own data set and calculations.

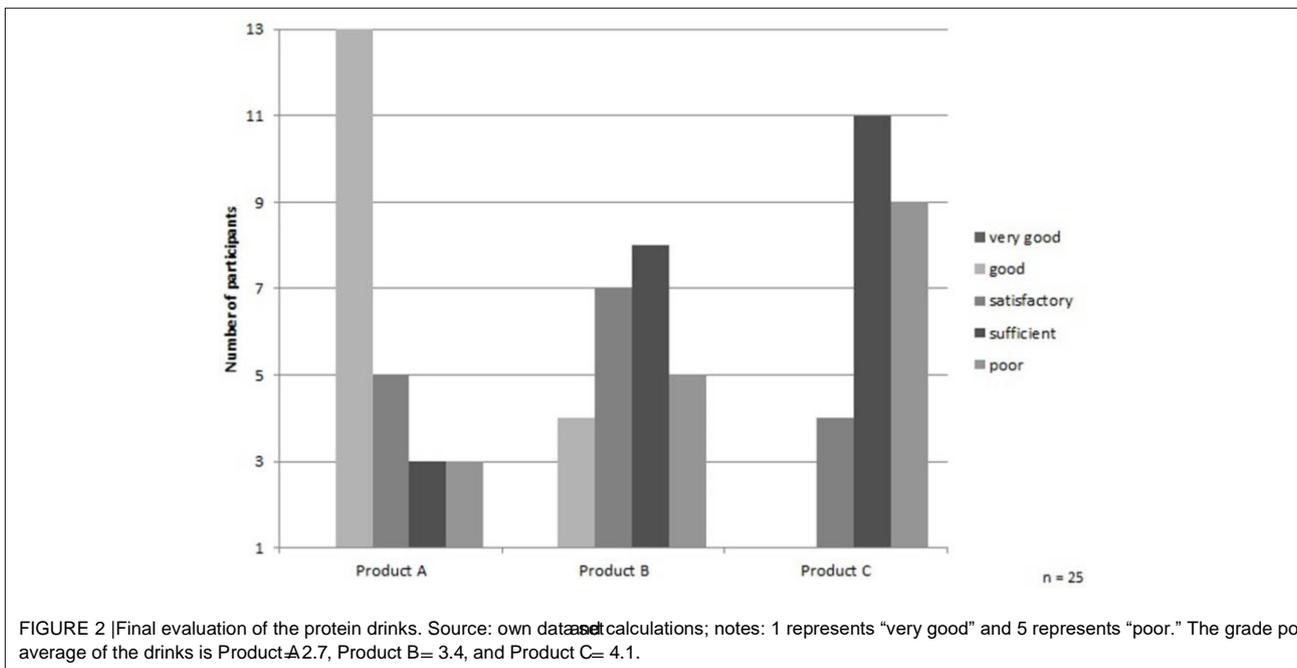


FIGURE 2 |Final evaluation of the protein drinks. Source: own data set and calculations; notes: 1 represents “very good” and 5 represents “poor.” The grade point average of the drinks is Product A=2.7, Product B= 3.4, and Product C= 4.1.

to integrate the drinks in their everyday life. Furthermore, participants did not see themselves as potential consumers of these drinks since the drinks did not fit into their lifestyles or daily nutrition plans. The following statements characterized this perception

“What kind of beverage shall it be [. . .], just drinking it if thirsty or am I supposed to drink it somehow after eating, or before [. . .]?”

Reasons for not knowing when to consume the drinks were first the taste, since the drinks were too sweet and did not correspond to their nutritional

habits. Conversely, the unseen necessity to consume additional protein led to unwillingness by the focus group participants to consume the drinks.

DISCUSSION

In this study, we conducted three focus groups ($n = 25$) to evaluate aspects that influence community-dwelling older people's perception of three commercially available protein drinks with at least 8 g of protein per 100 ml. We were especially interested in autonomous persons, whose decisions were still self-determined in order to find a product that can be readily added to the diet of older people to prevent frailty or other ailments caused by inadequate protein intake. Therefore, it is essential to understand the needs of this target group, who would voluntarily consume the protein drink.

The first perception influencing aspect of the protein drinks we found was a skeptical attitude toward the modern food industry. Second, we found fresh, natural foods, locally grown ingredients, purchased from a trustworthy manufacturer or distributor to be important factors for our target group. The latter explains why the participants were rather skeptical about the modern food industry and its food products, as both often do not comply with the requested criteria from the participants' point of view.

Literature confirmed the finding that groceries should comply with these criteria. Proximity to the manufacturer is an important aspect especially for older people in order to bypass agroindustrial conditions, whereas in contrast, the traditional country life is idealized, since it stands for health and naturalness (29). Furthermore, Steptoe et al. analyzed a correlation between age and the interest in consuming products with natural ingredients and the rejection of additives, whereas Roininen et al. confirmed this fact by finding a connection between older people and the use of natural products (30, 31).

The confusion and uncertainty we found toward dietary recommendations and in particular toward the

protein topic could be explained by the partially conflicting food-related information that older people are confronted with and what leads to that confusion. As a result, participants lacked knowledge about protein in general, although 20 participants stated they were very strongly or strongly interested in nutritional information. The literature cannot confirm this lack of knowledge, since most studies dealing with protein intake in older adults did not consider the knowledge aspect. Only van der Zanden et al. (18) dealt with this aspect and concluded that the participants did have knowledge about the importance of protein consumption, but not on its special physiological effect (18).

In our study, even after informing the participants about their special protein requirement, they did not see the necessity of consuming additional protein. The participants perceived their diet as already covering all their needs, which is also reflected in their perceived health status. A similar result was found by other researchers: the subjective health status is a probable barrier to change personal consumer behavior because of a perceived lack of necessity (18, 32). Moreover, if people do not consider themselves to be at risk for a certain threat, they would not be motivated to protect themselves (33), thus deeming the product unnecessary.

As another outcome of our study, the unperceived necessity to consume additional protein is reflected in the stated need for confirmation of increased dietary protein intake by a doctor. Considering the fact that participants were not convinced by the dietary recommendations given during the focus group, yet participants stated interest in doctor recommended dietary guidelines, also found by van der Zanden et al. (18) and Korzen-Bohr and O'Doherty Jensen (34), showed the particular importance of trust for older people. However, consumers' trust in the food industry is lacking (34).

It is unsurprising that people and especially the older generation (aged 75+) feel overstated with conflicting food related information, the wealth of dietary recommendations, and the abundance of food nowadays,

since this was not always the case during their life (35). This uncertainty should be considered when intending to support an appropriate amount of protein intake in older people within this food system and with a rather modern product.

Combining these results with the fact that a protein-dense drink can be used preventively and should be consumed when people still live independently, the significance of a suitable communication (strategy) becomes very apparent. We already discussed that people do not see the necessity of changing their behavior if they do not feel the consequences of it. Particularly knowing this aspect, the importance of suitable and continuous communication about the importance of adequate protein consumption for optimal longevity and independent living with a high quality of life becomes even more obvious.

That is why nutritional communication should turn away from a sender–recipient relationship, where communication is one-sided and individuals are understood as rational consumers, who only make knowledge-based decisions (36). Instead, there is an urgent need to implement communication at eye level for older people, which considers their ideas of a credible health elucidation. The specific ideas and wishes of older people in this area should be investigated in future studies. Additionally, they should be asked in such studies whether older people are interested in gaining specific knowledge in protein (enrichment) in their diets and physiological functions and in which way such a knowledge can be transferred.

As a result of our study, one possibility to avoid a sender–recipient relationship, where older people do not have any direct contact person to rely on, could be the collaboration with family doctors. The participants of our focus groups indicated that they would trust the opinion and suggestions of their family doctor and including their dietary recommendations. Since the majority of older people visit their family doctor frequently (37), the collaboration could be one manageable way in an atmosphere that promotes trust to explain the need to consume a certain amount of protein

even if the person feels healthy. As van der Zanden et al. (18) found similar results, this approach seems to be promising but is rarely considered in health care (18).

Furthermore, the majority of the participants did not like the protein drinks. If at all, most of them preferred the one that tasted the most fresh and fruity. This also supports the decisive influence of freshness and naturalness when buying food products. Arens-Azevedo and Behr-Völtzer (38) confirmed in their *textbook nursing care*, the reasons for food choice in older people being taste and pleasure, health aspects as well as compatibility, and habit (38). From the consumers' point of view in our study, neither pleasure, health, compatibility, nor habits were fulfilled by the commercial protein drinks. Only in the case of Product A (flavor: raspberry and blueberry) taste has been rated as good by the majority of the participants. However, simply reasonable taste of one of the tested drinks could not motivate the respondents to consume the protein drink frequently in the future. Therefore, after the consideration of the identified important aspects for the protein drink and its development, further studies with different flavors of protein drinks should be conducted with the target group.

One aspect that is continually mentioned in the literature is the heterogeneity in older people due to their long and different life experiences (39–41). With regard to our study, a significant differentiated perception within the target group was not observable. The respondents were all relatively consistent in their knowledge and perception concerning commercial protein drinks, as well as in regard to the important aspects they attached to food. Thus, we assume our results as valid, since consistency and repetition within the groups was shown.

Methodological Considerations and Limitations

In this study, the method of focus groups was chosen to gain deeper insights into consumers' perception of protein drinks. Since face-to-face interviews were conducted respondents were able to make requests, which add to the holistic understanding of the participants' perceptions. Furthermore, within focus groups the development of group dynamics is possible, so that polarizations arise and the reasons for certain opinions become clear. As we wanted to gain deeper insight into the factors influencing the perception of commercially available protein drinks by older people, the method of focus groups seemed to be highly suitable.

However, a limitation when conducting the three focus group refers to the sequence during product handling. As we first handled the product tasting, followed by a discussion and then the completion of the questionnaires for the respective protein drinks, we cannot rule out a bias due to the joint discussion regarding the answers to the questionnaires for the three protein drinks. The reason for this procedure was the fact that the same danger of bias also exists the other way around. If the questionnaire had been filled out first and discussed afterwards, focusing on the aspects covered by the questionnaire by the participants could not be excluded. However, our aim was to get a basic feeling for the perception of protein drinks and to listen to the participants independently of the hedonic test and let them discuss the aspects most important to them.

This study was performed with a relatively small sample, which is a state-of-the-art approach when working with focus groups. Thus, a generalization of the older population in Germany cannot be made based on the results of this sample, and such a generalization was not intended in this study.

Furthermore, protein drinks could appeal more to frail people, as it is probable that they consider themselves to be part of an at risk group due to their awareness of

their own frailty. However, since the protein drinks should be viewed as preventative in nature, individuals who are already frail were not the target group for our study.

In addition, the selection criteria of the protein drinks led to a specific and restricted sample of protein drinks mainly due to practical reasons and time requirements in order to not overstress the participants. Other reasons for the choice of the three selected commercially available protein drinks were the ambition for comparability among the drinks and the assumption that fruit flavors are associated with healthy food products. This focus was due to the target to analyze mainly the perception of product-inherent characteristics of protein drinks for older people as basis for developing a corresponding protein drink prototype. However, we have to acknowledge that the assumption that fruit flavors are associated with healthy food products cannot be underlined by the results of our study, since the older people in our focus groups did not associate the tested protein drinks with health or healthy food products. Therefore, the selection of only fruit tastes should be reconsidered in future studies because it limits the choice and excludes and disregards possible flavors that might have received more approval.

CONCLUSIONS

The aim of this study was to gain insight into the aspects, which influence the perception of commercial protein drinks with at least 8 g of protein per 100 ml from community-dwelling older people to understand their needs and find an adequate method for appropriate protein intake at this stage.

According to the presented results, we only found aspects, which negatively influenced the perception of commercial protein drinks. Reasons for these results were a general distrust in the modern food industry, the identified important aspects when buying (healthy) foods, which did not comply with the tested protein drinks, the perceived lack of necessity to supplement protein intake, participants' dislike of the

taste and flavor of the tested protein drinks, and a lack of usability of the drinks in the diet routine from the consumers' point of view.

For these reasons, we suggest that a future protein-dense beverage should be significantly less sweet—maybe offered in different flavors—less artificial, fresher, and consisting of more natural ingredients and ideally its ingredients should be grown locally. The latter could also reduce the distrust toward the modern food industry and its products if this aspect is communicated in a trustworthy way. During product development, different types of flavors should be tested by the target group. This could help overcome the lacking pleasure aspect of the drinks by the participants.

When developing a protein drink, communication about this product must be considered carefully. Aspects such as naturalness, freshness, and locally grown ingredients should be highlighted as well as the importance of protein consumption in old age. Thus, communication strategies must be reconsidered and revised, and the development of new strategies should be based on further research on the specific ideas and wishes for a suitable communication from the older peoples' point of view. As a mid-term effect, the negative perception of the drinks could decrease, and more older people would be willing to integrate a protein drink into their dietary routine. The collaboration with family doctors could be a possible step to start an appropriate communication strategy that also builds on the trust that family doctors have among older people.

Since we did not find a general reluctance toward a liquid product, which does not require cooking, we still find protein drinks to be one possible option to increase protein intake in community-dwelling older people. This could be combined with further strategies, for example, to develop other protein-enriched food products that can be integrated into the target group's meals and the technical and organizational routines of the communitydwelling homes.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The data protection officer of Hochschule Weihenstephan – Triesdorf, University of Applied Sciences (HSWT) approved the ethics and consent procedures for the study.

AUTHOR CONTRIBUTIONS

LL conceived and designed the experiments, analyzed the data, and was the first author and wrote the paper. LL and KM performed the experiments. AH, EK, and DV provided information on the nutritional background of the project, selected the test drinks, contributed to the development of the questionnaires, and drafted and revised the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix 7: Publication II

Ways of integrating eating into everyday lives – A Qualitative Study in Germany

Abstract: Food-related behaviour is a very complex topic. A common way to reduce complex issues to their essential content is to create a typology. In Germany, with regard to food-related behaviour, the creation of a typology has often been carried out by commercial research institutes, but also by (international) scientific institutes. The former have mostly used quantitative methods, the latter usually have a specific content focus. Within this study, we want to investigate which aspects are important to individuals from an individual perspective in relation to eating. Therefore, with the help of qualitative research methods, we pay special attention to how individuals integrate eating into their everyday life and thereby deal with themselves and their environment. For this purpose, both the individual action processes and the interpretation processes regarding food-related behaviour are to be taken into account. For this purpose, 37 qualitative interviews were conducted and evaluated by means of content-structuring qualitative analysis and type-forming qualitative content analysis. The result is seven eating action types, namely: *Eating as a way of life*, *The Relaxed*, *Eating as self-determination*, *Eating as a necessary Evil*, *The Adaptive*, *The Overstrained* and *The Controlled*. In this way, we contribute to the study of food-related behaviour, as the chosen qualitative method of type-building and looking at the whole spectrum of food-related behaviour from the perspective of the individual contributes to a broader understanding of this phenomenon and complements the findings of existing commercial and academic food-related typing-building activities.

Keywords: food-related behavior, eating action, qualitative type-building content analysis, typology, personality development

1. Introduction

Food has not only biological, but also social, cultural and psychological functions. Food is important for social relationships and communication, since it can signal friendship, belonging and closeness. In addition, it can indicate social status, power, hierarchy and exclusion and it expresses religious, ethical and moral beliefs. Food and eating can create self-esteem and emotional security, but also fear and guilt (Feichtinger, 1998). All these realms of everyday life can be influenced by food-related behaviour, thus making this a very complex issue (Holm & Gronow, 2019; Murcott, 2000; Warde, 2016). Due to this complexity, different doctrines, i.e. different nutritional approaches and

views, with interdisciplinary backgrounds have emerged and accordingly there is no uniform and coherent nutritional knowledge and thus behaviour (Ott, 2017; Schnurr, 2006).

One possibility to reduce complexity and to structure an area of investigation such as food-related behaviour is to build a typology. A typology is the result of a grouping process in which subjects or objects of an investigation area are grouped into similar types with regard to the defined characteristics (Kluge, 2000). Thus, by type-building (Diaz-Bone & Weischer, 2015; Kuckartz, 2014; Silver, 2013) facts are sorted according to comparable characteristics (Wienold, 2013). The aim is to reduce the diversity of the data to a few manageable and fruitful terms (Diaz-Bone & Weischer, 2015) and thereby reduce the complexity of situational or personal constructs (Brusten, 2013).

Both in quantitative research, e.g. via cluster analysis procedures, and in qualitative research, the principle of type-building is used to reduce complexity (Diaz-Bone & Weischer, 2015). Hence, to reduce the complexity of the various food-related behaviours nutrition typologies can be found in commercial consumer research as well as in scientific literature using quantitative and qualitative research methods.

For commercial consumer research, the building of nutrition types is already a common procedure. The primary aim is to explain the demand for food. In Germany, commercial market research institutes (Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Janke, 2009) have developed different nutrition types to explain the development of food demands. Frequently, these nutrition types are rather different among each other and the applied methods for their development often are not disclosed. Nonetheless, market research institutes commonly apply multivariate statistical methods that examine the consumers regarding their differences or similarities (Oltersdorf, 2019).

In addition, nutrition types are built in several (international) scientific studies (Blake, Bell, Freedman, Colabianchi, & Liese, 2013; Bruhn, 2008; Brunsø, Grunert, & Bredahl, 1996; Kluß, 2018; Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011; Stieß & Hayn, 2005). Many of the academic typologies concentrate on a special thematic focus, such as sustainability (Stieß & Hayn, 2005), pleasure (Kluß, 2018), healthy eating (Blake et al., 2013), sensory preferences (Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011) or obesity (Brunso et al., 1996). Moreover, most of the studies apply quantitative survey tools (Blake et al., 2013; Bruhn, 2008; Brunsø et al., 1996; Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011; Stieß & Hayn, 2005) or combine qualitative and quantitative survey tools (Stieß & Hayn, 2005).

In contrast to the commercial as well as academic food-related types mentioned above, we pay special attention to food-related behaviour from the individual's point of view and aim to consider the multiple aspects of how people integrate eating into their everyday lives. Our understanding of the human being is based on the socialisation theory of Hurrelmann and Bauer (2015), which is described in the "Introduction to Socialisation Theory" ("Einführung in die Sozialisationstheorie", Hurrelmann & Bauer, 2015). There, the authors describe the development of personality as a definitional component of socialisation, describing the 'lifelong acquisition of and confrontation with the natural endowments, especially the basic physical and psychological characteristics, which represent the "inner reality" for humans, and the social and physical environment, which represent the "outer reality" for humans' (Hurrelmann & Bauer, 2015 – own translation). These realities are not created and invented, but people have a methodical and epistemological access to inner and outer reality. Therefore, both realities are individually coloured. Accordingly, successful socialisation takes place when there is a successful assertion of subjectivity and identity following engagement with social structures through participation (Abels & König, 2016; Hurrelmann & Bauer, 2015). Therefore, the confrontation with inner and outer reality plays a crucial role in the development of personality. Accordingly, we believe that it makes sense to let a person report on something unhindered, without aiming at a specific question or answer, when it comes to capturing an unfiltered and authentic approach to food-related behaviour, as they actively and consciously engage with themselves and their environment. Spiekermann (2004) complies with this understanding when he describes that food-related behaviour should be understood as eating action ("Esshandeln", Spiekermann, 2004), since he describes this term as a combination of interpretation and action processes of active and self-thinking people. It considers experiences of individuals and their self-contained rationality (Spiekermann, 2004). Thus, it covers the entire sphere of the experience of food intake, including social references and ambience, thus, all perceptions during and after the meal (Pudel & Westenhöfer, 2003). In order to get closer to these action and interpretation processes of eating, a qualitative data collection is appropriate. The qualitative research paradigm advocates a humanistic view of human beings, in which people have free will and the need for self-realisation (Rogers, 2020; Schumann, 2018). Moreover, it allows the individuals to set their own priorities about their action and interpretation processes while being engaged with their environment, since *'The qualitative research interview attempts to understand the world from the subjects' point of view, to unfold the meaning of*

their experiences, to uncover their lived world prior to scientific explanations.' (Brinkmann & Kvale, 2015).

Thus, this study will focus on how people integrate eating into their everyday lives while engaging with themselves and the environment, thus living out personality development and related socialisation. The aim is to build types using type-building qualitative content analysis (Kuckartz, 2016) and following Spiekermann (2004). By that we can deepen the understanding of people's everyday actions in relation to eating as we can identify differences and similarities that exist regarding the way of how people integrate eating into everyday lives (Pahl & Setzwein, 1999) from the individuals point of view. By building types, the field of food-related behaviour with its complex interrelationships is reduced and simplified to a high degree and adequately, thus increasing clarity (Kluge, 1999). Thus, in this way, we contribute to the study of food-related behaviour, as the chosen qualitative method of type-building and looking at the full range of food-related behaviour from the individual's perspective contributes to a broader understanding of this phenomenon and complements the findings of existing commercial and academic nutritional types.

2. Material and methods

Data collection

In 2017, the first author conducted 42 qualitative individual interviews. They were carried out at the Chair of Marketing and Management of Renewable Resources at the City of Straubing, at the Institute for Biomedicine of Aging in Nuremberg, or at the home of the interviewees either in the City of Straubing or in the City of Regensburg. The participants were contacted by means of a university e-mail distribution list, a recruitment call in the local newspapers or a list of participants from previous studies.

The guideline for the interviews was developed after reviewing relevant literature about eating types. It consisted of six sections: the introduction including the informed consent, the application of the Operant Multi Motive Test (OMT), a section about eating action including a 24-Hour-Recall and a problem-centred interview, the application of the Personality Research Form (PRF) and a short-questionnaire about socio-demographic characteristics and a conclusion. The present manuscript concentrates on the data about eating action. We pretested the interview guideline twice and adjusted it slightly. All interviews were tape-recorded, except one, in which notes were taken (Flick, 2011; Witzel, 1985).

All participants gave informed written consent and their participation was voluntary. The Data Protection Officer of the HSWT approved the data privacy statement and the documentation of the procedure. Additionally, we followed the ethical principles of the Helsinki Declaration, the German Research Foundation (DFG) and the German Society for Sociology (DGS). At the beginning of the interviews, we emphasised that there were no right or wrong answers to avoid social desirability regarding a seemingly optimal nutrition. It has also been pointed out that the interviewer was no nutritionist with detailed knowledge in the nutrition sector, but a social scientist and that the subjective structures of meanings regarding eating were of main interest.

The section dealing with eating action started with the 24-Hour-Recall (Oltersdorf, 1984) about the previous day's diet as a stimulus to facilitate the introduction to the problem-centred interview and to activate the interviewees. We used pictures that showed a variety of typical groceries in order to support the memory, to visualise the diet day and to avoid palliations. We also offered inscribable proxy cards for the groceries that were not represented on our pictures. Due to the assumption that a normal weekday might be nutritionally different to a weekend-day, participants were additionally asked to describe the diet of the previous Sunday. If the previous day was a Sunday, participants had to describe the previous Friday as weekday (Stieß & Hayn, 2005).

The questions of the problem-centred interview considered the two dimensions of the eating action approach. These were questions about the type of groceries that were eaten, the cooking behaviour and arrangement of the eating situations and the snacking behaviour to cover the action processes. Questions about the significance that eating captures in everyday life, the emotions connected with eating, the meaning of eating in company and inner conflicts regarding eating covered the interpretation processes. Enquiries were always possible in the sense of a semi-structured interview (Brinkmann & Kvale, 2015) if more detailed information was needed. In the case of enquiries, the first author worked with the technique of paraphrasing, that is, the interviewer summarised the spoken word to reflect whether she had understood it correctly. Finally, all interviewees answered a questionnaire about socio-demographic characteristics (Flick, 2011; Witzel, 1985). The section about eating action took between 21 minutes and 61 minutes, with an average duration of 38 minutes.

All data has been anonymised to ensure that participants are not identifiable through their given information.

Sampling and participant information

In the recruitment process, care has been taken to form a relatively heterogeneous group of interviewees regarding age and to divide males and females fairly. The inclusion criterion for the interviews was an age higher than 17 years, due to privacy aspects and the need for parental consent for younger participants. There was no other criterion for inclusion.

As described above, 42 interviews were conducted, whereof 37 could be considered for the study. The other five were not considered due to one incomplete questionnaire, two unusable questionnaires, a different nationality that we decided afterwards not to consider in terms of comparability, and due to the mentioning of an eating disorder that we did not interpret as belonging to normal eating action. However, this number of interviews proved to be sufficient, as no new themes could be found during the interviews, which was confirmed by the data analysis. Thus, saturation was reached (Przyborski & Wohlrab-Sahr, 2008). None of the selected persons refused to take part, nor withdrew during the interviews. All interviewees received 15€ as appreciation for their participation. The youngest person was 18 and the oldest two were 83 years old. In total, we had 20 men and 18 women with a BMI range between 19.0 and 34.4. Accordingly, 27 participants had normal weight, eight participants were pre-obese, and three participants were obese according to the BMI (WHO, 2019). All participants were Germans. Thus, they were socialised with Western European culture. Three of the participants (all female) were vegan, three were vegetarians (one male, two female) and 31 were omnivore.

Data coding and analysis

The interviews were audiotaped and transcribed verbatim. The first author was the key person for the coding and analysis. Initially, qualitative content analysis in the form of a content structuring qualitative analysis was applied to analyse the data, as described by Kuckartz (2016). This form of analysis aims to identify topics and sub-topics and their systematisation and conceptualisation. As a systemising aid, we used MAXQDA as coding software (Rädiker & Kuckartz, 2019).

We have worked with the deductive-inductive approach (Kuckartz, 2016), whereby following the guideline, existing (deductive) as well as new (inductive) thematic (close to the material) and analytical (conceptualising, abstracting) categories were generated and identified (Kuckartz, 2016). The result was a hierarchical code system (Kuckartz, 2016) with 15 main categories and several sub codes each. Once, the categories had been created, we went through all interviews and assigned

suitable text passages to the categories. To ensure that the assignment undertaken was not subjective, the consensual coding technique was applied, so that two persons coded the interviews independently and compared their results afterwards (Kuckartz, 2016). The elicited categories were assigned either to the action processes or to the interpretation processes. With this, the generation of the code system was completed.

Next, a typology of eating action was built by following Udo Kuckartz's (2016) type-building content analysis. This procedure describes a methodological controlled analysis, in which a typology is the result of a grouping process where a certain social condition is divided into types by means of one or more features. As a result, the elements of one type are as similar as possible (internal homogeneity), but as different as possible compared to other types (external heterogeneity) (Kluge & Kelle, 2010; Kuckartz, 2016).

Then we wrote case summaries for each interview considering the two dimensions "action and interpretation processes", which form the feature space ("Merkmalsraum"; Kluge, 2000) for the typology. In doing so, we worked fact-oriented and close to the text from the perspective of the research question (Kuckartz, 2016).

To develop the typology, we worked in a team. Therefore, the case summaries were distributed fairly to five independent researchers, who again had to summarise the case studies in key words according to the two dimensions of the eating action approach. During two team meetings, the group members presented one after another their cases, i.e. subjects, regarding the important features and pinned them on a pin board – either next to or away from the already presented and similar or varying cases. The group constantly discussed the results. By this procedure, certain groups evolved (Kuckartz, 2016). The result was a coarse structure of the typology. The next step was to free the emerged types from their assigned cases. Then the first, second and third authors differentiated the emerged types. After the differentiation of the types, the cases were again assigned to the types (Kuckartz, 2006). The aim was to construct polythetic types, which means the cases that belong to one type are as similar as possible but must not be identical (Kuckartz, 2016). The result are real types (Kuckartz, 2006). All developed types are construct of model cases that are the synopsis of the best-suited text segments. For this purpose, relevant text segments are selected from different cases according to the criterion of plausibility for the type to be described and presented together to describe the one specific type (Kuckartz, 2016).

3. Results

The analysis of the problem-centred interviews and the typing resulted in seven *eating action types* as shown in Figure 1. The model has two axes. The vertical axis indicates the extent of the actions: the higher the eating action type found, the more active the type is in terms of eating. The horizontal axis indicates the reported extent of interpretation processes: the further to the right a type is placed, the stronger its mental interpretations are towards its food-related behaviour. To be able to determine the placement of an eating action type in Figure 1, we summed up the number of expressed main categories for the action as well as for the interpretation processes. Using this procedure, we quantified the stated main categories of the interviewees.

[Insert Figure 1 about here.]

In the following, all *eating action types* are described in detail. We start with a general summary of the respective type and continue with a focused perspective on certain, essentially characteristic attributes. In order to underline our findings, we make use of meaningful quotes.

Eating as a way of life (A)

The eating action type *Eating as a way of life* (3 assigned persons: 2 females, 1 male) is located in the right upper corner of Figure 1. Accordingly, this type is both strong in reported action and in interpretation processes.

Generally, individuals of this type follow an idea of an ideal nutrition, such as veganism or a diet mainly based on (wild) herbs that affects not only their food-related behaviour in every thinkable realm. The nutritional ideas are characterised by self-imposed rules and claims out of conviction, and which have an impact on the general conduct of life. The persons of this *eating action type* fully endorse the chosen concept. Accordingly, food-related behaviour is given high priority.

Regarding the action processes, it should be pointed out that the handling of one's own claims towards the social environment is emphasised:

“My inner conflict in this context, of course, is how you then perceive other people in relation to their eating habits. If I accept what the other person eats and thus accept him/her in the same way. Do I then also accept the habits he/she has and say with it that it is not actually bad; because that would be a contradiction with my own attitude. And I found out for myself someday that I can just accept a person for his/her humanity, but still find habits he/she has as not good. And then I actually get along quite well with that. You can also like other people and spend time with them and still say this or that

behaviour that you show there is not good and that was the breakthrough to be able to sit at the table with other people while they eat their steak or something.” (Concept: veganism)

The acquisition of information of members of this eating action type makes it possible to develop their own food concept. These can be obtained either by persons or by other information sources. Within its concept, this type puts high emphasis on eating according to their own personal and bodily needs. Therefore, it is very important not to be constrained or influenced by external factors. Possible needs are for example the need for a sensible handling and intake of food. This aspect explains why people of this type often grow their own fruit and vegetables in their gardens. The essential requirement of a sensible intake of food is connected to expediency and salubrity but also gratitude, as pointed out:

“Well, I am very grateful for the food I have and that I am able to buy organic food. Because I know a lot of people who would like to do that, but they don't have the money. (...) Yes, because I perceive life more consciously now. I don't know/ I just think I'd say to eat more consciously and to be grateful for it.”

The individual idea and the associated behaviour, and the consumption of corresponding food leads to a good conscience, and therefore corresponding food is often used as a reward. Moreover, people of this type also reflect on what their behaviour does to others, and thus relate to others and develop new demands from that.

The Relaxed (B)

The type *The Relaxed* (7 assigned persons: 4 females, 3 males) is as strong as *Eating as a way of life* in both the reported action processes and the interpretation processes and is accordingly placed in the same position.

The relationship of *The Relaxed* towards their own food-related behaviour and implied ideas about the right behaviour towards their own food can be described as conscious and relaxed, the way it is implemented works without efforts. Accordingly, the action processes are reported as being high because food-related principles are indeed performed. Hence, food and everything related to it plays an important role for individuals of this type.

Because food is strongly connected to positive emotions such as pleasure, joy and anticipation, this type sometimes eats more than physically needed. Additionally, it is perceived as too costly to regularly cook only for oneself. Nonetheless, this type formulated the demand for a warm (and self-

made) meal once a day with food from their own garden. Thereof, people of this type prepare food in batches in order to meet their own ideas. These ideas are summarised in the following statement:

“But as a rule, I plan the weekend in such a way that I have the weekend in advance to really have something warm on the table for lunch, something I cooked myself. Yes. And I just try to put a lot of emphasis on good food, of course on what we grow ourselves.”

If these ideas are fulfilled and the food is taken in sensibly, people emphasise the resulting good conscience:

“I feel good and comfortable with it, firstly because I know that I enjoyed it, secondly because I had time, that I could enjoy it, that I wasn't under any time pressure and thirdly because I believe that I also fed myself well and correctly and varied.”

Additionally, people of this type develop their own health concepts, whereby feeling comfortable with the ideas of what they consider to be an appropriate food-related behaviour regardless of the actual effects.

Eating as self-determination (C)

The type *Eating as Self-determination* (7 assigned persons: 5 females, 2 males) has been placed relatively centrally, but with a tendency to the left, due to its reported action and interpretation processes (Figure 1). Food is given a high priority, since it is seen as a means to satisfy the self-related needs. The self is the focal point of this type and their own needs and claims get special attention. Thus, people of this type want to live with the freedom to live as they choose. However, with regard to their consumption patterns, this type does not follow any stand-alone idea such as veganism; they rather develop self-made nutritional concepts. These imply particularly the claim for a healthy nutrition, or a healthy saturation, respectively.

Although seemingly contradictory, exceptions to the actual consumption behaviour underline the importance of the self and its well-being: exceptions are fine if they serve the satisfaction of one's own needs and circumstances do not currently allow otherwise. Spontaneous consumption thus serves as compliance with the claim to a self-determined diet, because depending on the situation and individual feelings, it is decided what is perceived as an appropriate meal. The focus is still on the self, implicitly asking: What is doing me good right now?

The interpretation processes are characterised by the claim for self-made food, as follows:

“Basically, I feel better when the food comes from home or when I made it myself or my mum made it.”

Homemade food receives special attention from this type. The resulting associations are consistently positive. This circumstance shows once again the importance of self-determination for this type: because only those who cook for themselves really have control over what they eat.

Eating as a necessary Evil (D)

The type *Eating as a necessary Evil* (3 assigned persons: 2 females, 1 male; average age is 81.6 years) is localised relatively far up on the left in Figure 1, since it is in the upper range regarding its reported action processes and relatively low reported interpretation processes.

The type *Eating as a necessary Evil* is marked by little involvement in food-related behaviour. Eating and everything that belongs to it does have low importance, it is rather perceived as something necessary in order to live. Thus, little thought is given to food, eating and the behaviour that goes with it. Additionally, this type is emotionless about eating.

Certainly, a rare cooking frequency was mentioned by this type due to the lack of motivation to cook only for oneself. Therefore, a rather simple cuisine is preferred; individuals of this type mostly prefer cold or simple meals. Moreover, this type often eats together with other persons because of the importance attached to social interactions and the fact that food is more likely to be neglected. However, this type reports on weight control, although this does not really influence or stress the individuals in their daily lives, as the following quote underlines:

“Don't have any problems. Only that I still have to bring the weight down.”

Individuals of this type do not connect any positive emotions with food and eating, as follows:

“So [it = eating] is necessary for the preservation of life, but there is no fun in it. I can't say.”

The fact that food does not play a major role in everyday life of this type is not perceived as disturbing or regrettable. If the latter were the case, people of this type would not behave as they do. Accordingly, people belonging to this type feel positive about their food-related behaviour.

The Adaptive (E)

The Adaptive (5 assigned persons: 1 female, 4 males) is placed almost at the bottom left of the Figure 1. The reported action and interpretation processes are rather weak, since adaptation to others is the characteristic feature of this type. Accordingly, people of this type are not actually active in their food-related behaviour, but rather remain inactive until other people become active or decide

how to act. The individuals belonging to this type then simply have to participate. The adaptation to other people becomes clear by the following statement:

“Okay, and that's where I adapt. Then I eat white bread or baguette or on weekends [...] the only son who still lives in [...] comes with his wife and one of my grandchildren [...] and they bring, I pay, but they bring the food. Therefore, they determine [...].”

The citation also shows that there are hardly any individual demands, which are consistently implemented in their own food-related behaviour.

Cooking is especially fun when other people are involved and form part of the action, i.e. that they at least eat the prepared food together. Eating together with other (close) people gets special attention, as the following quote emphasises:

“So I think that [...] the dining room is such a common place or the place of meeting and where one does something together, takes meals together, sits at a table and in peace and not shoo, shoo, between door and hinge/ no, I don't like that. And yes, [there] is not a side table somewhere in the kitchen [...], but in the dining room [...] at the dining table and the table is set properly and [...] yes, and eaten together. And it doesn't matter whether it's the children and me or all four of us.”

In addition, this type develops its own health concept. Thus, subjective reference values are formed with regard to their own health, which lead to a health concept independent of objective guidelines or scientific knowledge. However, this concept can also be understood in the sense of adaptation: their own health concept is also adapted to the corresponding and unforeseeable situation and so the consumption of food to be consumed at that moment is simply declared as healthy.

The Overstrained (F)

The Overstrained (8 assigned persons: 2 females, 6 males) has been placed relatively far to the right and relatively far up in Figure 1. This type reports being relatively strong in its interpretation processes and less strong in action processes, though still rather active. The overstraining derives either from personal overstraining with eating (internal: 4 subjects: 2 women, 2 men) or from external circumstances like unemployment or illness, which are hard to handle for individuals (external: 4 subjects: 4 men). Thereby, individuals of this type debate with themselves what and how to do the things correctly. Accordingly, this type reports behaviour patterns that evolve from these debates, but with which they do not feel comfortable, but rather unsecure about the effects. Moreover, weight control plays an important role. In addition, there is a strong mental confrontation with the

fear of weight gain or with the discomfort of the current physical condition. Generally, *The Overstrained* is often stressed when it comes to nutritional issues, as for example by saying:

“And sometimes it's stress because when I can't decide what I want, it stresses me. Especially before shopping, because I always think about what I have to buy or what I want to buy and that's a mixture of I'm actually happy that I can buy everything I want, because I don't have anything at home and on the other hand it's like: buy the RIGHT one too.”

People of this type lack the feeling for a subjectively adequate and good diet. This leads to a negative assessment of their own food-related behaviour and explains body sensations of insalubrity. Nevertheless, this type also expresses its joy or anticipation of eating:

“It's like, for example, if we go somewhere to eat where I know it's delicious and I know the menu, then I'm very happy and happy all day long and I think about what I'm going to eat tonight or what I feel like eating.”

The obvious contradiction between stress and anticipation towards the food-related behaviour is a clear indication of the overstraining. The quote underlines the importance attached to food and eating, which is the reason for the overstraining: only something that means a lot to someone can make that person unhappy if he or she has not yet managed to develop its appropriate implementation.

The Controlled (G)

The Controlled (4 assigned persons: 2 females, 2 males) is placed at the very bottom in the centre of Figure 1. Characteristic of *The Controlled* is a compulsion that forces this type to keep control of their body. The strong need to control one's own behaviour is the only reported action process in which this type is really strongly involved and can be understood as its unique characteristic; other reported action processes are rather indifferent. This is the reason why this type is characterised by low action processes.

Parts of the body control refer to weight control, a strongly represented aspect in this type. This was for example expressed as:

“But even if I'm hungry, I still don't eat. Because I always pay attention to my kilos. But I actually like doing it (eating) very much.”

The statement clearly shows that control behaviour is perceived as self-imposed limitation. In addition, a characteristic behaviour for this type is to balance previous behaviour by actions such as sports or food restrictions, as the following quote shows:

“Or [doner kebab], I always think, only the content would be enough already. But well, I always weigh it up, what have you eaten today, what have you done, HAVE you done something, have you only sat at your desk or not, so you go for a walk.”

Moreover, this type is generally strong in creating its own beliefs by forming its own concepts of faith. People belonging to this type also believe in natural bodily concerns, which are expressed through statements such as listening to the own body. Furthermore, both sports and dietary restrictions as compensatory behaviour are accompanied by intense mental debates. Some of these debates relate to cognitive reactions caused by eating. Here, the focus is on weighing up processes, e.g. with regard to the question whether dinner should be taken late in the evening at all.

4. Discussion

In this study we have concentrated on the way in which everyday food-related behaviour is integrated into everyday lives, considering how people actually eat (action processes) and how they interpret (interpretation processes) their own food-related behaviour. We used a qualitative approach, since this allows considering an individual view of food-related behaviour and not limiting people in what they perceive as being important to them. Our approach resulted in seven qualitative *eating action types*, named *Eating as a way of life*, *The Relaxed*, *Eating as self-determination*, *Eating as a necessary Evil*, *The Adaptive*, *The Overstrained* and *The Controlled*. In the following, we discuss the types considering current insights into food related behaviour.

Eating as a way of life reflects personalities, who want to move freely within their nutritional ideas. The Assignment to such a dietary conception can be understood as a "formal" self-characterisation regarding one's own consumption in the sense of Totaro and Marinho (2019), i.e. identification with socially standardised and impersonal models. With reference to Klotter (2016), we assume people of this type to be alternative eaters, for whom food and body are spiritualised, both are woven into a web of meaning. Alternative eaters become ecological or ethical and feel like their minds are winning over their bodies. Thus, it is a form of self-realisation (Klotter, 2016), since *‘People are well aware, i.e. self-conscious, of the artificiality of lifestyles and can choose to do or discard them.’* (Murcott, 2000). Hence, the emphasis of the type's own demands (e.g. sensible food intake)

belongs to differentiation mechanisms (Totaro & Marinho, 2019), since personality development is also a matter of external perception, as it develops through the interaction of individuals with the environment (Hurrelmann & Bauer, 2015; Klotter, 2016). Through the interrogation with others, the own way of how to integrate eating into everyday lives becomes very clear, whereas external influences on it are categorically rejected, as mentioned by *Eating as a way of life* and what in turn forms part of their personality.

In contrast, *The Relaxed* have a stress-free relationship with their own food-related behaviour and are clear about how they want to shape their behaviour in relation to food. The food-related behaviour of *The Relaxed* may be interpreted as the ability to eat in a moderate way (Dijker, 2019). Dijker (2019) elucidates the major components for a moderate eating manner, which are perception, consciousness and motivation. Perception is related to a care-based approach to other people and to food, consciousness refers to the belief about the special nature of food, and motivation represents cooking skills (Dijker, 2019). These aspects already reveal a fair amount about the character of this type and the presence of these components results in moderate eating without self-control and without abandoning the pleasure of eating. Pleasure, joy and anticipation are associations repeatedly mentioned by *The Relaxed*. Thus, *The Relaxed* complies with the demanded consciousness, emphasising the need for food from their own cultivation, a warm meal once a day and a sensible food intake. Moreover, Dijker (2019) emphasises craftsmanship as an ideal concept to understand the motivation to cook. Although people of *The Relaxed* at times lack the motivation to cook, by cooking in batches, they have found a way to implement craftsmanship and comply with motivation as one part of moderate eating

By *Eating as self-determination*, food-related behaviour is understood as a possibility for self-determination and the associated well-being (Deci & Ryan, 2000). What distinguishes this type from *Eating as a way of life* is that they do not follow an own idea of nutrition, by which they define themselves in relation to the social environment, and which has far-reaching consequences for all areas of life. Rather, it is about getting the best out of the respective situation for one's own well-being, which is how diet-related exceptions come about. In the self-determination theory (SDT), motivation is the energy to act. *Eating as self-determination* acts in the sense of autonomous motivation (Deci & Ryan, 2000), since people of this type are self-motivated to achieve their goals with the help of volunteer resources (Sheldon & Elliot, 1998) if it leads to the satisfaction of their

own needs. Through autonomous motivation, this type manages to satisfy its needs and feel comfortable. Moreover, autonomous motivation explains spontaneous consumption patterns, since it fosters creativity, problem solving, performance and positive emotions (Deci & Ryan, 2000).

Eating as a necessary Evil differs from the other types as eating and everything that belongs to it has no special relevance for this type. It is reasonable to assume that the non-existent desire to eat is age-related. There is substantial scientific literature that explains the reasons for the loss of appetite in old age, with malnourishment as a consequence (Becker, Kaiser, & Zolondek, 2001; Engel, 2004; Volkert, 2015). However, people of *Eating as a necessary Evil* neither lack appetite nor are undernourished. They lack the importance that food and eating has for most people. What really matters are family and friends. People of this type put special effort into spending time with important people, since '*Ageing (...) poses an increased risk of isolation and lack of social interaction, particularly at meal times.*' (Cappelletti et al., 2010). This is problematic insofar as the decline in relationships in old age is caused by factors that are beyond individual control (structural losses in the circle of friends and acquaintances, legal regulations on retirement) (Hormann, 2013). Therefore, emotional states such as loneliness and loss may appear. In short, people of this type actively try to keep alive the remaining social relationships they have and rate the value of eating as secondary.

The Adaptive is marked by the adaption to other peers and relatives and no independent food-related behaviour. This is the reason for the rather low involvement in eating action. For social adaption, three essential aspects are required, namely identity preservation in the course of adaption, the perception of the adaption as desired action and the existence of appropriate circumstances enabling the subject to implement the required changes (Chernyakova, 2014). Thus, if people adapt to others, it must '*allow individuals to maintain their socio-cultural nature, their personality, and life purposes.*' (Chernyakova, 2014). The adaption to others represents a way to live their own personality. Thus, for *The Adaptive*, food-related behaviour can be understood as one of many areas, where living in accordance with their own personality by adapting to others comes into play.

An overstraining with the subjectively correct implementation of food-related behaviour marks *The Overstrained*. People belonging to this type see their action possibilities as somehow limited, either because of inner or outer constraints. Literature gives diverse reasons for the feeling of limitations ending in overstraining (Green, 1993; Naigaga, Pettersen, Henjum, & Guttersrud, 2018;

Spiteri Cornish & Moraes, 2015). One mentioned reason is competing expert recommendations that cause a feeling of opacity (TNS Infratest GmbH, 2009). As result, people are confused with nutrition issues regarding their diseases and react with frustration and apathy towards nutrition science and health information, as mentioned by *The Overstrained*. Spontaneous behaviour and simple cuisine can be explained by the fact that people prefer to avoid stress by spontaneously opting for simple foods and thus avoiding a more intensive examination of possible complications (TNS Infratest GmbH, 2009). However, spontaneous and simplified behaviour do not tackle the root of the problem, leading to a negative feeling and frustration when the '*right thing*' is actually supposed to be bought. Moreover, people have their own subjective food-related needs. However, the handling of a subjectively correct food-related behaviour becomes even harder when social norms want to be fulfilled but do not comply with subjective pleasure. It can be assumed that the overstraining is influenced by a discrepancy between implicit and explicit motives. *The Overstrained* repeatedly emphasised the discrepancy between inner values, ideas and desires and external circumstances and demands. Job, Oerting, Brandstätter, and Allemann (2010) showed that motivational discrepancy is related to emotional distress, as the latter may be responsible (at least in part) for the link between motivational discrepancy and food-related behaviour. People with motivational discrepancy eat more and prefer unhealthy, tasty foods because they want to downregulate the emotional distress caused by motivational discrepancy (Job et al., 2010).

The Controlled is marked by its strong need to control the own body. Sociological theories of action assume the body to be a controllable instrument that is subservient to the will of human beings (Klein, 2010; Lane, 2017). Moreover, in the 20th century of hegemonic Western cultural industries, thinness became a dominant cultural ideal (Bordo, 1993) and is now the reference model that men and women usually refer to when they care about their bodies (Hesse-Biber, 2007). Body modifications are connected to success. According to Sieber (1999), the winning types of our time swim, run and fight, for '*muscular, well-trained, fitness strong*' (Klein, 2010) bodies represent positive connoted social norms such as e.g. achievement, perseverance or strength and shape the thinking of people, strengthen social conventions and represent effects of social power (Foucault, 2007; Klein, 2010). Sports and a balanced diet are the main practices to achieve an athletic body (Antonova, Merenkov, Gurarii, & Grunt, 2019). For Foucault (2007) the body is the object and target of power, and thus, for *The Controlled* it can be assumed that apparent power is gained through the

satisfaction of social norms by self-control. This kind of conviction and behaviour can be recognised as inherent to this type. Although body modifications are described as voluntary by Antonova et al. (2019) in order to comply with social power and the body ideal of western cultures (Volonté, 2019), the desire for an athletic and slim body seems to force this type to implement body control.

The identified seven *eating action types* underline some results already found in previous studies. There are for example Nestlé's nutrition types, of which some use similar names, such as *The carefree full eaters (The Relaxed)*, *The Hunted (The Overstrained)*, *The health idealists (The Controlled)* (Janke, 2009), or AC Nielsen's nutrition types, such as *The carefree (The Relaxed)*, *The close to nature (Eating as a way of life)*, *The body-conscious (The Controlled)* (Czinkota, 2017). However, these types have been surveyed with quantitative methods, are therefore limited to statistic data excluding the subject as centre of interest and undermine personal and profound responses without predetermined response options. Moreover, the *eating action types* of this study differ from nutrition types that have a certain content focus (Blake et al., 2013; Brunsø et al., 1996; Kluß, 2018; Obermowe, T., Sidali, K. L., Hemmerling, S., Busch, G., Spiller, A., 2011; Stieß & Hayn, 2005).

Another major and important result of this study is the identification of *The Overstrained* as an independent *eating action type*. This behavioural pattern cannot be confirmed by other studies, where overstraining occurs within other types, but does not describe an independent food-related behaviour (Bruhn, 2008; Czinkota, 2017; G+J Media Sales, 2012; GfK Consumer Panels & Bundesvereinigung der Deutschen Ernährungsindustrie e.V., BVE, 2015; Janke, 2009; Kluß, 2018; Stieß & Hayn, 2005). As Hayn (2008) and Jastran et al. (2009) explain, everyday activities must be implemented actively; they must therefore be constructed, stabilized, maintained and changed by the individual (Hayn, 2008; Jastran et al., 2009). In this study, it was suggested that *The Overstrained* failed to implement actively everyday food-related behaviour due to perceived internal or external constraints.

In summary, it is possible to identify similarities and differences between the individuals and create types according to the way how people integrate eating into everyday lives. As seen in the results, there exist different ways of how to develop personality and socialise successfully with the everyday action of how to integrate eating into everyday lives. Only *The Overstrained* builds an exception by not managing to integrate a feel good kind of eating action. This may result in a

disturbed personality development and a failed socialisation due to a conflict between internal or external constraints. However, it is equally possible to overcome the feeling of being overstrained. The feeling should therefore not be understood as static, but as dynamic, which can be changed with appropriate support.

Finally, in the sense of limitations, we cannot make any claim to general validity with 37 interviews conducted, which would also contradict the qualitative research approach. Additionally, we can relate our results only to Germany and they might differ in other countries. In addition, we have committed ourselves to the goal of building polythetic types. Nevertheless, there are individual differences depending on the people assigned within the types. In each case, we had to decide how to deal with this aspect. The results show the outcome of this decision-making process.

5. Conclusions

The seven *eating action types* of this study are characterised by an individual-centred approach that leaves the voice with the subject and allows for a detailed description of people's eating action. Eating is an everyday act, which makes it complex, but it also influences many areas of everyday life and can be used to develop personality.

With our qualitative type-building approach, we could reduce the complexity of and structure how people integrate eating into their everyday lives, while engaging with themselves and the environment. Our typology shows the differences and similarities that exist regarding the complex issue of food-related behaviour of individuals from the individual's point of view. Our results partially confirm existing commercial and academic nutrition typologies that use a quantitative approach only, but also complement and extend the findings of these existing typologies. Therefore, our study provides useful insights for nutrition counselling, for marketing purposes and for socio-cultural research, which can generate practical life and food-related solutions for eating-related (mis)behaviour based on the results. However, in order to be able to compare the results of this study with other cultural circles, further research is necessary, using quantitative methods if necessary, in order to be able to make a claim to comparability.

Declaration of competing interest

The authors declare that they have no competing interests.

Author Contributions

Lyn Lampmann conceived, designed and performed the experiments; Lyn Lampmann analysed the data with the support of Madlen Grau. Lyn Lampmann was the first author and wrote the paper. All authors contributed to the writing process.

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Ethical Approval

Ethical approval was not required because no questionable (medical or morally reprehensible) research was conducted on the participants of this study.

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Appendix 8: Figure of Publication II

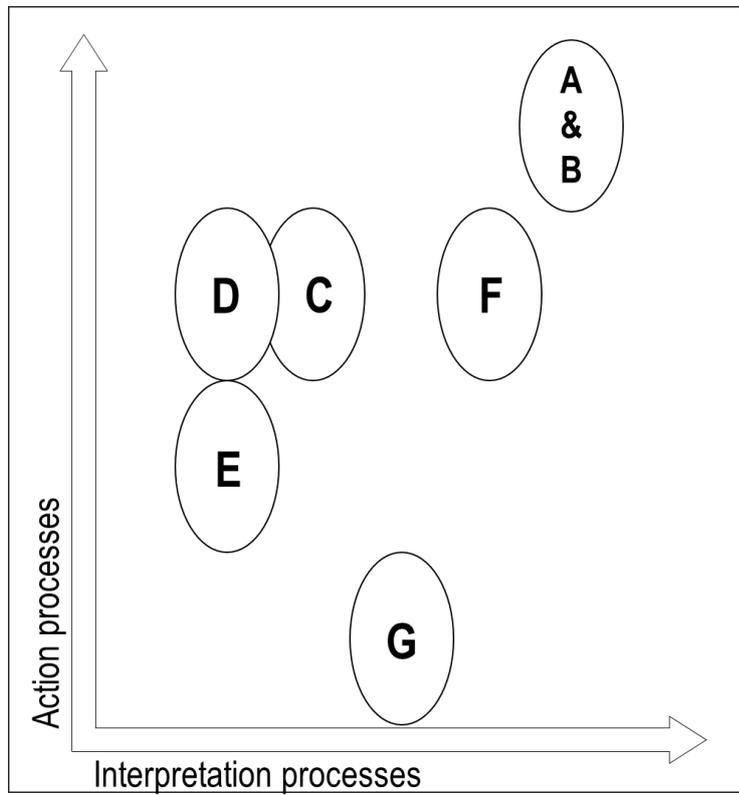


Figure 1: Model of Seven Eating Action Types: A = *Eating as a way of life*; B = *The Relaxed*; C = *Eating as self-determination*; D = *Eating as a necessary Evil*; E = *The Adaptive*; F = *The Overstrained*; G = *The Controlled*

Appendix 9: Publication III



Is there a relationship between implicit motives and eating action types: An exploratory study in Germany

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Abstract

Investigating unconscious human behaviours is a complex issue, given that people have hardly access to their unconscious. Food-related behaviour is one of these behaviours in which the unconscious plays a central role. Therefore, the connection of the unconscious and food-related behaviour is difficult to comprehend. Hence, our exploratory study deals with the relationship between implicit motives as an important part of the unconscious and their relationship with food-related behaviour. For this purpose, we used the Operant Multi-Motive Test (OMT), which offers information about implicit motives of individuals. Based on 37 qualitative problem-centred interviews conducted in Bavaria, Germany, we identified seven *eating action types* that we combined with the results derived from the OMT. These deliver profound insights into *how* people eat due to their identity. The approach of this study is *explorative* and provides a first insight into a possible relationship between implicit motives and food-related behaviour that are presented descriptively. Our initial results show that a relationship between implicit motives and food-related behaviour can be assumed, although it cannot be directly deduced from the sole analysis of food-related behaviour. However, nutrition consultancies, food companies, policy makers and advisors may be interested in these insights related to understanding the impact of the unconscious on food-related behaviour.

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Keywords

qualitative interviews, the unconscious, eating action types, implicit motives, operant multi-motive test

Introduction

According to Koster (2009) and Wansink and Sobal (2007), most of our decisional processes regarding food-related behaviour take place unconsciously. Nonetheless, in food-related consumer and sensory studies, this fact does not play a relevant role: '[...] findings about intuitive reasoning and the clear demonstration of the unconscious nature of most of our decision-making do not seem to have touched sensory and consumer research, although they probably play a more important role in food-related behaviour than anywhere else'. (Koster, 2009). In culturally/sociologically oriented consumer research, the situation is different. Here, the view of the exclusively rational consumer has been largely abandoned. Instead, practice-theoretical approaches are increasingly receiving attention (e.g. Plessz and Wahlen, 2020; Warde, 2016), in which the unconscious plays an essential role. Eating, as everyday action, is understood as 'cultural activity par excellence' (Warde, 2016), and the impact of the unconscious on everyday actions is strongly supported in cultural and sociological consumer research.

Besides, from an empirical position, researchers mainly applied questioning techniques to examine food-related behaviour (Costa et al., 2007; Nielsen et al., 1998; Rejman and Kasperska, 2011). Nonetheless, because of the at least partial unconscious nature of food-related behaviour, asking people about the reasons for that particular behaviour furthers storytelling, since people do not know about their unconscious principles and therefore tend to comply with social desirability (Koster, 2009). According to Wilson (2002), we respond to such questions with narratives, which we invent partly based on what we infer from recalled past behaviour, but which are only weakly related to our actual behaviour (Koster, 2009; Wilson, 2002). This is one reason why the causes of individual food-related behaviour are still a complex issue from a scientific point of view. Therefore, Koster (2009) and Hanna et al. (2013) call for the development of a new methodology, which works with implicit approaches in order to better retrace human food-related behaviour. Additionally, Koster (2009) calls for more interdisciplinary research in this field.

Dealing with food-related behaviour means dealing with the behaviour of individuals. To analyse the behaviour of individuals, motivational theory is particularly interesting since it aims to answer questions such as 'what drives people?, how does motivation arise? and how do motivated people take decisions?' (Felser, 2015). Motivation theory is premised on implicit motives, which every human being carries within him or herself and which are relevant drivers of our behaviour because they want to be satisfied, otherwise the human being is dissatisfied. Implicit motives (also referred to as operant motives) are affect-based and unconscious preferences, which are learnt through affective experiences in pre-speech early childhood. They respond to intrinsic incentives since they refer to the individual frame of reference. It is the way of behaviour coming from personal initiative,

without many thoughts and which is repeated over a longer period (Brandstatter et al., 2013). These implicit motives have a huge impact on behaviour patterns of human beings since they occupy a lot of space in the individuals' world of thoughts and need to be satisfied (Krug and Kuhl, 2006). In addition, the term 'motive' is frequently used by food scientists in their search for the reasons behind food-related behaviour (Costa et al., 2007; Martins and Pliner, 1998; Nielsen et al., 1998; Prescott et al., 2002; Renner et al., 2012).

In summary, food-related behaviour is a very important but often unconscious human behaviour, but the exact effect of the unconscious behaviour on food-related behaviour has not yet been fully understood by science due to methodological difficulties (Koster and Mojet, 2007). Implicit motives in turn have a strong influence on human behaviour and form an important part of the unconscious (Krug and Kuhl, 2006; Kuhl, 2013). We therefore assume that implicit motives have an impact on the food-related behaviour of individuals. Accordingly, our study addresses the question of whether there is a relationship between implicit motives and food-related behaviour and how this relationship is shaped. To answer this question, we look at people's food-related behaviour using seven eating action types developed in a previous study (Lampmann et al., n.d.) and applied the Operant Multi-Motive Test (OMT) to determine their implicit motives. For the development of the eating action types, we have addressed, among other topics, the importance and significance of shared (family) meals (Danesi, 2018; Moisio et al., 2004; Plessz and Wahlen, 2020), adaption processes and demarcation processes based on special eating styles and their justifications (Grauel, 2016; Papaioikonomou et al., 2016) and the importance of buying local food products as support for the local economy (e.g. Schoolman, 2020). With this use of methods, we are applying an interdisciplinary study design, as Koster (2009) requests. In the discussion section, we try to embed our findings on the relationship between food-related behaviour and implicit motives in relevant theories. However, it is important to understand that our approach is an explorative one as the targeted question has not yet been investigated in this way. Therefore, we do not aim at quantitative statistical analyses to show, for example, significant influences between the variables. Rather, we offer a descriptive analysis of the data by comparing the eating action types with the results of the OMT.

Theory

In the following section, we present our understanding of the relationship between the individual and society, their interaction and the unconscious located therein.

Theoretical positioning

Our understanding of human beings in relation to their environment is based on Hurrelmann and Bauer's (2015) socialisation theory described in 'Introduction to socialisation theory' ('Einführung in die Sozialisationstheorie', Hurrelmann and Bauer, 2015). There, they describe the development of personality as a definitional component of socialisation, which is 'the lifelong acquisition of and engagement with the natural

endowments, especially the basic physical and psychological characteristics, which constitute the “inner reality” for human beings, and the social and physical environment, which constitute the “outer reality” for human beings’ (Hurrelmann and Bauer, 2015). The realities are not created and invented, rather people have methodical and epistemological access to the inner and outer realities. Therefore, both inner and outer realities are individually coloured. In this theory, motives are understood to be located in the individual.

Successful socialisation is described as the successful assertion of subjectivity and identity after engagement with social structures through participation (Abels and König, 2016; Hurrelmann and Bauer, 2015). Hence, dealing with both the inner and the outer realities plays a decisive role for personality development. In our research, we have chosen the perspective of the individual as the starting point and thus the inner reality of individuals. Committed to qualitative research, we advocate a humanistic view of human beings, in which people have free will and the need for self-realisation (Rogers, 2020). However, unconscious processes are by no means denied in this view (Abels and König, 2016; Hurrelmann and Bauer, 2015; Rogers, 2020; Schumann, 2018). Especially concerning food-related behaviour, the unconscious seems to play an important role (Klotter, 2015; Koster, 2009; Wansink and Sobal, 2007). Thus, conscious processes do not exclude unconscious ones and the transitions are sometimes fluid.

Eating as action, action as motivation

Since food-related behaviour is a specific type of human behaviour, it is useful to look more closely at what motivates people to be active in general and how the implicit motives come into play.

Motivation is that which causes people to behave at all (Brandstatter et al., 2013). Motivational psychology deals with target-oriented human behaviour and analyses the orientation, endurance and intensity in the pursuit of goals. Action orientation refers to the reasons that lead a person to pursue a particular goal. These reasons indicate what is important to a person. They are incentives to act that are inherent in the activity itself or functional incentives that only arise when the goal is achieved. The unmanageable variety of individual incentives can be arranged according to thematic content, commonly referred to as incentive classes. These incentive classes describe thematically distinguishable, positively evaluated target states (Brandstatter et al., 2013). Individual preferences for certain target states are referred to as motives (McClelland et al., 1989). Thus, they form the behavioural determinants of a person. People differ in how important certain classes of incentives (positively rated target states) are to them and they differ in how they pursue their goals (Brandstatter et al., 2013).

In addition to individual preferences, a second determinant of behaviour comes into play: the environment. Thus, behaviour is guided by factors that lie within the person and factors that lie within the environment (opportunity, demands and incentives). Behaviour is only motivated when a person with preferences encounters an environment in which the desired incentives are available. Therefore, behaviour is absent if one of the two factors is missing. Another aspect of goal-oriented behaviour, endurance, describes the action that

remains on target despite interruptions or distractions. Intensity of goal pursuit as the third factor concerns the effort and concentration that a person puts into pursuing a goal (Brandstatter et al., 2013).

Implicit motives

Implicit motives are the individual preferences for certain target states. In this study, we refer to the definition of motives as 'networks of experiences, stored in pictures (not in terms), which a person has made in his or her life (particularly formative in early childhood) in connection with the satisfaction of a need, for example, which actions he or she has tried out in which situations with which (satisfaction) success' (Kuhl, 2013 – own translation). Needs are understood as the core of the respective motive that wants to be satisfied. Accordingly, motives form an action portfolio of how a need can be satisfied. Thus, needs are caused by the discrepancy between what is and what should be (Kuhl, 2001).

According to McClelland (1985), the fantasy of every human being is predominantly occupied by three motives, namely affiliation, achievement and power (Krug and Kuhl, 2006). These motives occupy a lot of space in the individual's world of thoughts. The stronger a motive, the more it outweighs the other motives and the more it dominates the individual's thinking, perception and experiences: strong motives thus control our behaviour (Krug and Kuhl, 2006). The definition of motives is based on the assumption that perception and identification with a certain situation set free significant components of a personality, since 'people tend to interpret an ambiguous social situation in accordance with past experiences and current needs' (Murray, 1943). Thus, if a person comes into a situation similar to a past situation in its motive-relevant attributes, then the experienced pictures appear automatically, for example, what the person did in this situation and how successful the action was. Therefore, motives especially influence the interpretation of a current situation as it is perceived which need could be satisfied in which way. However, the appearing pictures are represented non-verbally and do not have to become conscious. Accordingly, these motives are described as implicit motives, in contrast to explicit motives, which are represented verbally and consciously. Explicit motives are not considered in this study. Implicit motives are defined as being of operant nature (i.e. spontaneous behaviour) while forecasting behavioural trends over a long period (Kuhl, 2013).

Stable needs, as being the core of motives that want to be satisfied, develop amongst others from confrontation with motive-relevant natural stimuli. These become visible through family structures and their mechanisms. Hence, the extent of warmth defines the development of the affiliation motive ('hunger for love'). The extent of guidance from parents and their demands for early independence influences the achievement motive ('hunger for self-efficacy'). The extent of dominance within a family is critical to whether

1 need for power develops ('hunger for influence') and the extent to which basic needs such as free self-development become frustrated in early childhood increases the need for a free authentic self. Thus, the development of implicit motives is highly connected to reactions of socialisation conditions, which varies within individuals due to their

personality dispositions (Kuhl, 2013). Hurrelmann and Bauer (2015) state in this context that external reality has always been mediated and made accessible by the family as the 'primary socialisation instance', since it has a targeted influence on the way external reality is appropriated and processed. Parents in particular have a corresponding influence on the personality development of their children. Finally, Kuhl (2013) summarises with references to Kornadt et al. (1980) 'Together, these four motive systems form basic motivational equipment that is common to all people on the one hand, but at the same time, it is based on differential differences'. (Own translation).

The natural stimulus of the affiliation motive is to establish friendly relationships with others, to maintain and cultivate these relationships and to restore disturbed relationships (Krug and Kuhl, 2006). The motive for affiliation is unintentional (Kuhl, 2013). Achievement-motivated people are driven by the joy of perfect and the dislike of emergency solutions. They enjoy their own abilities and are annoyed by their own in-ability. They strive to become better and want to avoid stagnation (Krug and Kuhl, 2006). Thus, this motive is effect-oriented (Kuhl, 2013). Power is based on the natural stimulus of having influence. It is therefore effect-oriented too (Kuhl, 2013; McClelland, 1985). The subjective feeling of strength marks the connected condition. The function of the power motive is to move instinctively within hierarchical structures and is associated with formal social influence as well as with impulsive, uninhibited, aggressive behaviour and extreme willingness to take risks (Kuhl, 2013; McClelland, 1975; Winter, 1973). Additionally, Alsleben and Kuhl (2010) discuss an extended form of the motive structure and consider a fourth motive, the motive for individual liberty ('Freiheit', Alsleben and Kuhl, 2010), which refers to the need for free, authentic selfhood (Alsleben and Kuhl, 2010). The needs of this motive are self-preservation, self-differentiation and self-growth. Thus, this motive stands for freedom from self-alienating inner or outer influences and is correspondingly unintentional (Kuhl, 2013).

Materials and methods

Data collection

The empirical bases for the study at hand are 42 qualitative interviews, which were conducted by the first author (Self-identifying initials) in 2017. These interviews took place in three smaller as well as larger cities in Bavaria, Germany, at the university or at the home of the respondents. The recruitment of participants was conducted by means of a university email distribution list, a newspaper advertisement or by contacting participants from previous studies.

We used an interview guideline, which was developed based on a detailed literature review on the connection between motives and food-related behaviour. It covered five thematic sections: 1. the introduction with the informed consent, 2. the OMT, 3. a section about eating action, which included a 24-hour recall and a problem-centred interview, 4. the Personality Research Form (PRF) and subsequently 5. a short questionnaire about socio-demographic characteristics. The guideline was pretested and adjusted accordingly. With the exception of one interview, all interviews were tape-recorded and then

transcribed verbatim. During the interview in which the respondent refused to be audiotaped, notes were taken (Flick, 2017; Witzel, 1985).

The Data Protection Officer of the (Self-identifying institute) approved the data privacy statement and the documentation of the procedure. All participants gave their written informed consent, and their participation was voluntary. Additionally, we adhered to the ethical principles of the Helsinki Declaration, the German Research Foundation (DFG) and the German Society for Sociology (DGS). All data have been anonymised to ensure that participants are not identifiable through given information.

The only criterion for inclusion was an age above 18 years, given that for younger participants parental consent is needed. During the sampling process, we aimed to receive a relatively heterogeneous group of participants concerning age and gender. Because of two incomplete OMTs, uselessness, a different nationality and a disclosed eating disorder, 37 of the 42 conducted interviews were used for the study. Nonetheless, saturation was reached as during the interviews no new food-related themes emerged, which was confirmed by the analysis of the data (Saunders et al., 2018). In the end, all originally invited persons participated in the study, and there were no cancellations during the interviews. Interviewees received €15 as incentive. The age of the interviewees was between 18 and 83 years. Consolidated, the study was realised with 19 men and 18 women with a BMI range between 19.0 and 35.4 (Lampmann et al., n.d.). Accordingly, 26 people were of normal weight, eight were pre-obese and three were obese (World Health Organization Europe, 2020). All participants were German natives and accordingly socialised with Western European culture. Three participants (all female) were vegan, another three were vegetarian (1 male and 2 female) and 31 were omnivore.

According to our understanding, eating takes into account the subjective interpretation of one's own food-related behaviour (Spiekermann, 2004). In this respect, Spiekermann suggests that eating should be understood as eating action ('*Esshandeln*'; Spiekermann, 2004), defining this term as the combination of interpretation and action processes of active and self-thinking people. It also takes into account the experiences of individuals and their self-contained rationality (Spiekermann, 2004). Thus, eating action considers what people do (action processes; '*Handlungspozesse*', Spiekermann, 2004) as well as how people interpret their action processes (interpretation processes; '*Deutungsprozesse*', Spiekermann, 2004).

The present study concentrates on the data derived from the OMT in conjunction with seven qualitative eating action types: Eating as a way of life; The Relaxed; Eating as self-determination; Eating as a necessary Evil; The Adaptive; The Overstrained and The Controlled (described in detail in Lampmann et al., n.d.). These were developed based on the data of the problem-centred interviews using the qualitative method of typing (Kuckartz, 2016) and are based on the eating action approach.

The eating action types are not about what is eaten, but about how eating is integrated in everyday lives against the background of internal and external reality. We have prepared an overview table, which includes a short description of each of the types (see Table 1). This supports to demonstrate the identity of individuals that according to Hurrelmann and Bauer (2015) is understood as continuous self-experience across different developmental and life phases based on the positively coloured self-image.

Table 1. Overview of the contents of the seven eating action types (Lampmann et al., n.d.).

Eating action type	Short description of eating action	Essential quote	Possible explanation
Eating as a way of live (N = 3)	Characterised by a uniform food concept, such as veganism or a diet based mainly on (wild) herbs, these concepts steer one's own nutritional behaviour in a certain direction, which is determined by self-imposed rules and demands out of conviction and which have an impact on the general lifestyle; however, the chosen concept remains entirely endorsed.	So the last few years I have been VERY busy with it, but I am now putting this knowledge into practice. That's why I don't read so much in books anymore, because I have the knowledge now and integrate it into my everyday life or shopping.	Spiritualising food and the body through alternative eating. Thus, victory of the mind over the body (Klotter, 2016).
The Relaxed (N=7)	Characterised by a conscious and relaxed relationship with their own food-related behaviour and the ideas implied. The implementation of the ideas works without effort. Food is strongly associated with positive emotions such as pleasure, joy and anticipation.	I feel good and comfortable with [the meal], firstly because I know that I enjoyed it, secondly because I had time, that I could enjoy it, that I wasn't under any time pressure and thirdly because I believe that I also fed myself well and correctly and varied.	Dijker (2019) explains the ability of a moderate eating style, which is characterised by perception, consciousness and motivation, representing elements that can all be found in this type.
Eating as self-determination (N=7)	Nutrition is given a high priority as it is understood as a means of implementing and satisfying one's own needs. The self is at the centre of attention and the own needs and demands receive special attention. The need to be free in one's own decisions is high. However, this type does not follow a unified concept such as veganism but develops its own food concepts, which in particular include the demand for healthy eating.	But I still always look forward to my salad for lunch. [...] especially because I know that it is homemade and because I know what's in it. Well, that is also important for me. I feel much better when I eat my salad than a meatloaf bread roll I bought at work.	In self-determination theory (SDT), action can be taken according to autonomous motivation (Deci & Ryan, 1985, 2000), whereby food-related behaviour is understood as an opportunity for self-determination and the associated well-being (Deci & Ryan, 1985, 2000).

Table 1. (continued)

Eating action type	Short description of eating action	Essential quote	Possible explanation
Eating as a necessary evil (N=3)	Food and everything that belongs to it is of little importance. It is rather understood as something necessary for life. Therefore, little thought is given to food, eating and the behaviour associated with it.	So [eating] is necessary for the preservation of life, but there is no fun in it. I cannot say.	Age plays an important role here as age brings with it an increased risk of a lack of social interaction, which is particularly evident during meals (Cappelletti et al., 2010). This can lead to loneliness. For this reason, these people attach particular importance to their remaining social relationships and rate food as secondary.
The Adaptive (N=5)	Adaptation to others is the characteristic feature of this type. Therefore, the food-related behaviour is not implemented independently. Rather, they wait for others to become active in terms of food and they just have to join in. Accordingly, eating together with other (close) people is of special attention.	Okay, and that's where I adapt. [...] on weekends [...] the only son who still lives in [...] comes with his wife and one of my grandchildren [...] and they bring, I pay, but they bring the food. Therefore, they determine [...].	According to Chernyakova (2014), the preservation of identity in the course of adaptation, the perception of adaptation as a desired action and the existence of appropriate circumstances that enable the subject to make the necessary changes are essential aspects of social and successful adaptation. Accordingly, adaptation reflects behaviour that goes along with well-being while preserving one's own identity.

(continued)

Table 1. (continued)

Eating action type	Short description of eating action	Essential quote	Possible explanation
The Overstrained (N=8)	Characterised by overstraining with food. Overstraining results either from personal overload or from external circumstances such as unemployment or illness. Individuals debate with themselves what and how to do things properly, but do not reach a good solution. This leads to behaviour patterns, which they do not feel comfortable with and which further unsettle them.	And sometimes it's stress because when I can't decide what I want, it stresses me. Especially before shopping, because I always think about what I have to buy or what I want to buy and that's a mixture of I'm actually happy that I can buy everything I want, because I don't have anything at home and on the other hand it's like: buy the RIGHT one too.	It can be assumed that the overstraining is influenced by a discrepancy between implicit and explicit motives. Job et al. (2010) showed that motivational discrepancy is related to emotional distress, while emotional distress is (partly) responsible for the connection between motivational discrepancy and food-related behaviour. People with motivational discrepancy eat more and prefer unhealthy, tasty food because they want to downregulate the emotional stress caused by the motivational discrepancy (Job et al., 2010). The Overstrained repeatedly emphasised the discrepancy between internal values, ideas and wishes and external circumstances and demands.
The Controlled (N=4)	Characteristic for this type is the compulsion to keep control over one's own body. This strong need is seen as a unique and particularly characteristic feature of this type, as it determines all food-related behaviour.	But even if I'm hungry, I still don't eat. Because I always pay attention to my kilos. But I actually like doing it [eating] very much.	Sociological theories of action assume that the body is a controllable instrument that is subject to the will of humans (Klein, 2010; Lane, 2017). Body modifications are associated with success because athletic bodies represent positively connoted social

norms such as performance, endurance and strength (Klein, 2010).

OMT procedure

To identify the predominant motive(s) of the respondents in this study, we applied the OMT. We chose the OMT because it is less time-consuming to administer and evaluate than the other two implicit motive tests (Picture Story Exercise (PSE); the Multi-Motive Grid). In addition, it has already been tested more extensively for its validity (Schüler et al., 2015) and it is available in German language.

The OMT is based on the Thematic Apperception Test (TAT) (Murray, 1943) and its motive key ('Motivschlüssel', Kuhl, 2013), representing a projective psychological test (Kuhl, 2013). Since the motive for individual liberty was added, the OMT represents an extended version of the TAT.

The OMT is a procedure developed by IMPART (Institute for Motivation, Personality, Assessment, Research and Training) GmbH (Impart GmbH, 2020), requiring a licence in order to use it for scientific purposes (G. Ritz, personal communication, 06 November 2017).

The OMT consists of 15 pictures depicting different situations involving at least one person. Next to each picture are three questions: 'What is important for the person in this situation and what is he or she doing?', 'how does the person feel?' and 'why does the person feel this way?' The participants had to reflect their subjective interpretation of the depicted situation in written form with keywords or short sentences (Kuhl, 2013).

So far, the OMT, or similar procedures for the collection of implicit methods, has been used for basic research (Quirin et al., 2013a, 2013b; Scheffer et al., 2007) but also in the field of nutrition (Job et al., 2010).

OMT – data analysis

The data derived from the OMTs was systematically coded by IMPART GmbH as well as by the first author¹ according to the evaluation key generated by IMPART GmbH. This implies empirically proven thresholds that divide the motives into low-level motives, motives of the lower average range, motives of the upper average range and high-level motives. The sum of categories divided by the number of answered pictures ($\sum Ki / n$) provides information about the peculiarity of the motive (Kuhl, 2013). According to that evaluation key, a dominant motive is defined as a motive of the upper average or high-level motive. According to Krug and Kuhl (2006), international studies showed that the dominance of one motive occurs for about 60% of people, the dominance of two motives for 30%, for 5% all three motives are dominant and for the other 5% none of the motives are prevailing. Subsequently, the first author reviewed the coding. The compliance rate was about 60%. Based on the expertise of IMPART GmbH, their assessment was relied upon in case of disagreement. The motive dominance of the interviewed individuals was identified with that procedure.

Subsequent to the coding, the eating action types (Lampmann et al., n.d.) were analysed for similarities and differences in their motivational structure within a type as well as among the types using the MAXQDA software (Radiker and Kuckartz, 2019). For this purpose, it was examined how often the respective motives occur within a type. In each

case, we first looked at the most dominant motive of each individual belonging to the respective **eating action type**. In addition, we considered the second strongest motive of the individuals of each type, but only if it exceeded the threshold of a dominant motive. Afterwards, we used the absolute frequencies of dominant motives per individual as an indicator to describe the motive structure of a certain **eating action type**. In addition, we also consider the particularly weakly pronounced motive, if it exists, within one **eating action type**.

Results

As mentioned above, this study uses a preliminary approach and must be understood as exploratory research. Therefore, the analysis of the relationships between implicit motives and **eating action types** is presented in a descriptive form.

In our study, most of the **eating action types** are strong only in one motive (**Eating as a way of life**; **Eating as self-determination**; **Eating as a necessary Evil**; **The Adaptive** and **The Controlled**) and two are strong in two motives (**The Relaxed** and **The Overstrained**). This statement is based on the following procedure: each individual in our sample has one or two dominant motives. Applying this to the **eating action types**, the question is whether the majority of assigned persons are dominant in one or two motives. If the majority of the members of one **eating action type** are dominant in only one motive, the whole type is understood as dominant in only one motive. If the majority of individuals of a specific **eating action type** are dominant in two motives, the type is also dominant in two motives. It is not surprising that the majority of eating behaviours are associated with only one dominant implicit motive as this result is in line with the findings of international studies according to Krug and Kuhl (2006).

Based on the described analysis one of our main findings is that people of one particular type do not automatically have the same motive structure as we initially assumed.

Eating as a way of life is only dominant in one motive, whereby the prevailing motive is either power or individual liberty. The particular weak motive of this type is affiliation. According to Klotter (2016), individuals of this type are to be understood as 'alternative eaters', whereby the food and the body are spiritualised, tied into a web of meaning, whereby the mind wins over the body. Hence, the motive for individual liberty fits well into this picture, since eating differently can be interpreted as a distinctive need for independence. By emphasising this otherness, the power motive can also be interpreted as fitting, since the emphasised otherness towards others can create a feeling of influence.

The Relaxed is rather strong in two motives considering the amount of individuals belonging to it, which is power as the most frequent one, followed by affiliation and achievement. However, achievement appears merely as the second dominant motive. A particular weak motive is not identifiable for **The Relaxed**. Compared to the other **eating action types**, the motive of affiliation only plays a dominant role for **The Relaxed**. It is conceivable that this type implements a moderate way to eat (Dijker, 2019; Lampmann et al., n.d.). Considering the motives of achievement and affiliation, this can be explained.

The moderate way to eat implies perception as a care-based approach towards other people and food (affiliation) and motivation in terms of cooking skills (achievement). The presence of these concepts can result in moderate eating without self-control and without abandoning the pleasure of eating (Dijker, 2019).

The type **Eating as self-determination** is only dominant in one motive, which is either power or achievement. The motive for individual liberty is particularly weak within this type. However, neither power nor achievement can be associated with the eating action of this type.

The majority of **Eating as a necessary Evil** has only one prevailing motive, which is either power or individual liberty. For this type, achievement is particularly weak. As mentioned above, behaviour is only motivated when a person with its preferences encounters an environment in which the desired incentives are available. Since eating has no particular relevance for this type, we assume that it does not work as incentive for motive satisfaction.

The **Adaptive** is characterised by an unusually high need to adapt to others and to represent accordingly no (value) conceptions of its own. Nonetheless, this type feels comfortable with its style. Considering the number of individuals with a dominant motive, this type is strong in two motives, which are achievement and individual liberty. Due to its motive structure, this type is not fully comparable to the other **eating action types** but rather seems relatively specific. Particularly weak is this type in its endeavour for power. This result was to be expected, being characterised by its adaptation to others. Accordingly, the type is constantly under the influence of others. This means that this type is influenced deliberately, but there is no interest in influencing others. However, individual liberty is one dominating motive for this type. In Lampmann et al. (n.d.), we have stressed the need for subjects to preserve their identity in the process of adaptation. The adaption must be perceived as a desired action, and the existence of appropriate circumstances must be given in order to enable the subject to implement the required changes (Chernyakova, 2014). Thus, adaptation to others only takes place if it is one's own wish and if it happens voluntarily.

The **Overstrained** is only dominant in one motive, whereof the most frequent one is power, followed by achievement and is particularly weak in affiliation. It can be assumed that the overstraining within this type is influenced by a discrepancy between the implicit and the explicit motives. Explicit motives, in contrast to implicit ones, are those that are cognitively elaborated and can be verbalised. They stand for the image that is to be presented of oneself to the outside world (McClelland et al., 1989). If implicit and explicit motives diverge, this leads to malaise. Job et al. (2010) showed that motivational discrepancy is related to emotional distress, while emotional distress is (partly) responsible for the connection between motivational discrepancy and food-related behaviour. The results support the idea that people with motivational discrepancy eat more and prefer unhealthy, tasty food because they want to downregulate the emotional stress caused by the motivational discrepancy (Job et al., 2010). Hence, this explanation leads to the fact that the dominant motives found here have no further meaning for the time being. They would then be significant if there were no overstraining and people of this type could be assigned to another **eating action type** to which they would belong without suffering from overstraining.

The Controlled is only strong in the motive for power. With that, it differs from all other types. The particular weak motive for this type is individual liberty. Holding control over one's own body can represent effects of social power (Foucault, 2007; Klein, 2010) by exercising strong control over one's own body and thus receiving social recognition. Through social recognition, individuals influence others by representing role models, strength or the common ideal of beauty (Gortler, 2012). Thus, the strong need to control one's own behaviour can be explained by the prevailing power motive in this type.

Discussion and conclusions

Our research design should be understood as a first exploratory approach. Since there is a lack of suitable methods for qualitatively investigating the relationship between implicit motives and other factors, we developed the present approach. To do this, we had to develop our own principles and decide how to analyse the relationship between implicit motives and eating action types. In this context, we see our approach as a starting point and there is a need for methodologically oriented studies on this relationship in the future.

In this study, we have committed ourselves to Hurrelmann and Bauer's (2015) socialisation theory and a humanistic view of the human being. Besides this, behaviour in connection with consumption has increasingly been examined from a practice-theoretical perspective in recent decades (Bourdieu, 2011; Giddens, 1997; Warde, 2005, 2014). The focus of these studies was primarily on cultural consumption research. Accordingly a new, comprehensive and particularly recognised theory by Alan Warde 'The Practice of eating' (Warde, 2016) as well as empirical studies on eating as practice (Connolly and Prothero, 2008; Halkier and Jensen, 2011; Wahlen, 2011) have emerged. However, practice-theoretical perspectives do not place the origins of unconscious behaviour within the individual, as perceived by Hurrelmann and Bauer (2015), Krug and Kuhl (2006), Kuhl (2001) as well as by Koster (2009). Instead, it is brought to the individual by the external reality, by means of the habitus (Bourdieu, 2011) or teleofactive structures (Welch, 2020). In this respect, the view of the individual differs in our study.

Moreover, it might be interesting in future studies to focus on a narrower group of participants, for example, in relation to certain types of implicit motives and then to explore in depth the food-related behaviour of these consumers. In this context, it would also be interesting to analyse the variation that can exist over a certain period in food-related behaviour. For example, it could be investigated what happens when people experience major changes in their lives. It is assumed that during these transition phases a change in food-related behaviour is also possible (Chung et al., 2007; Hopkins et al., 2014; Mathur et al., 2008; Wolf et al., 2014), and it could be investigated how this affects or can be explained by implicit motives.

In addition, it could be interesting to investigate the differences in implicit motive structure between men and women and how this affects food-related behaviour as it is commonly known that men and women eat differently (Max-Ruber-Institut, 2008; Nestle Deutschland AG, 2019).

With this study, we were dealing with an exploratory approach, the combination of food-related behaviour and psychological approaches by using qualitative methods to elicit the reasons behind behaviour. As the results of this study suggest that implicit motives have an influence on food-related behaviour, they may be of particular interest to interdisciplinary researchers who want to understand the relationship between individual and social behaviours, between unconscious and conscious behavioural contexts or who want to understand (un)well-being or (in)consistent behaviour due to implicit and explicit motive discrepancies. Accordingly, nutrition consultancies, food companies, policy makers and advisors may be interested in the insights gained in this study about the influence of the unconscious on food-related behaviour.

Author Contributions

The first author conceived, designed and performed the experiments, analysed the data and wrote the article. All authors contributed to the writing process.

Declaration of conflicting interests

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Ethical Approval

Ethical approval was not required because no questionable (medical or morally reprehensible) research was conducted on the participants of this study.

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Note

LL In order to be qualified to evaluate the OMTs, the first author attended a training course on this topic offered by IMPART in 10/2017.

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Appendix 10: Publication IV

Determining the Distinguishing Features of Different Eating Action Types in Germany using a Mixed-Method Approach

Abstract: Food-related behaviour is a very complex topic, as it affects the most diverse areas of life. Accordingly, wide varieties of disciplines have already dealt with the topic to understand it better. The result is that there is neither a uniform nutrition knowledge nor a uniform nutrition behaviour. In order to reduce the complexity of a field of study, there is the methodical means of type-building. Both commercial and academic studies have already formed nutrition types, either by means of standardised questionnaires or with a specific content focus.

However, since both individual and social aspects influence food-related behaviour, we investigate how people integrate eating into their everyday life against the background of (competing) individual and social demands by focusing on the individual point of view, for which a mixed methods approach is used.

Based on 42 semi-structured, problem-centred interviews conducted in Germany in 2017, we built qualitative food-related types in a first step, which are analysed in this article using a quantitative content analysis and cross-over analysis to identify the particular distinguishing feature(s) of each type and test them for significance. The results show the prominent characteristics for each type and indicate furthermore that subjectivization, self-determination, the body as an instrument of power, adaptation to the environment and being overstrained with the own behaviour are particularly prominent when it comes to eating. Moreover, we clearly identified *The Overstrained* and *The Relaxed* as independent *eating action types*, which we could not find anywhere else.

Keywords: Eating Action Types; Data Transformation; Quantitative Content Analysis; Cross-over Analysis

1. Introduction

'Food is so important, and permeates human life in so many ways, that it engages and interacts with almost all of our activities: leisure, the art, sex, work...' (Rozin, 2006). The fact that so many areas of daily life can be influenced by food-related behaviour has led to different nutritional ap-

proaches and views, with neither uniform nor coherent nutritional knowledge nor behaviour (Ott, 2017; Schnurr, 2006), making it a very complex issue (Holm & Gronow, 2019; Murcott, 2000; Warde, 2016).

In order to reduce the complexity of a field of study, types can be build. In this process, subjects or objects of an area of study are classified by means of grouping processes based on previously defined characteristics (Kluge, 2000). The aim of type-building (Diaz-Bone & Weischer, 2015; Kuckartz, 2014; Silver, 2013) is to reduce the diversity of data to a few viable and substantial terms (Diaz-Bone & Weischer, 2015). This approach can be implemented using qualitative methods as well as quantitative methods.

In Germany, many of the existing nutrition types have been developed by commercial market research institutes (Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Janke, 2009; Nestlé Deutschland AG, 2021) mainly to explain food demand of differing consumer groups. Generally, these nutrition types are rather heterogenic and the applied methods how they have been built often do not lay open. Nonetheless, these institutes normally apply multivariate statistical method that examine the consumers regarding their differences or similarities (Oltersdorf, 2019). One well-known example are the seven Nestlé nutrition types (Nestlé Deutschland AG, 2021). Based on the nutritional attitudes of the respondents, Nestlé found *The Passionless Pragmatists*, *The Problem Conscious*, *The Carefree Full Eaters*, *The Hunted*, *The Health Idealists*, *The Nest Warmer* and *The Modern Multi-Optional* (Nestlé Deutschland AG, 2021). In 2012, the Rheingold-Institute has come up with 10 nutrition types. Amongst the results were types called *Mr. and Mrs. Right*, *Salad Singles*, *Machines* or *Food Poser* (G+J Media Sales, 2012). The GfK built eight cooking types, based on the purchasing behaviour) of the households. The built types have names like *The High-Class Cook*, *The Everyday Cook*, *The Weekend Cook*, *The Warmer* and *The Out-Of-Home Eater* (GfK, 2015). Additionally, Nielsen Holdings plc published in 2017 seven nutrition types built by requesting 10.000 subjects about their dietary habits, the underlying reasons and the belonging trigger (Czinkota, 2017).

In addition to the nutrition types of the commercial market research institutes, such nutrition types also were built in Germany in several scientific studies (Bruhn, 2008; Brunsø, Grunert, & Bredahl, 1996; Kluß, 2018; Stieß & Hayn, 2005). Brunsø et al. (1996) developed the food-related lifestyle and defined it as a system of cognitive categories, which were related to different dimensions of nutrition. Based on a survey instrument consisting of twenty-three sub-dimensions focusing on pur-

chasing behaviour, cooking methods, quality aspects, consumption situations and purchasing motives they found five consumer groups in Germany: *The Uninvolved*, *The Careless*, *The Conservative*, *The Rational* and *The Adventurous* (Brunsø et al., 1996).

Bruhn (2008) developed a Lifestyle Decision Typology of Nutritional Behaviour resulting in four nutrition types (e.g. *The Disinterested Consumer*, *The Traditional Consumer* etc.). By applying the food-related lifestyle (FRL), a subsequent cluster analysis and a survey of the dietary behaviour, the respondents were segmented according to their lifestyle for food and its significance for health-conscious eating habits (Bruhn, 2008). The aim was to contribute to behavioural prevention measures in the context of a growing obesity rate.

Kluß (2018) analysed the meaning of pleasure, the ability to enjoy and the enjoyment orientation and found e.g. types named: *The Pleasure-Oriented* or *the Rational*. The study was based on a qualitative study and evaluated secondary analytical 26 guideline-based interviews. The interviews dealt with attitudes toward nutrition, eating habits and situations analysis (Kluß, 2018).

In contrast, Stieß and Hayn (2005) focused on the nutritional action in everyday life of the respondents to develop strategies that promote a sustainable nutrition. The aim was to illustrate action options and latitudes of the consumers in the context of environment, nutrition and health and their claims towards a sustainable and healthy nutrition. Seven nutrition styles were built, such as *The Disinterested Fast-Fooder* or *The Cheap and Meat Eaters*, based on the purchasing, cooking or comprehensive nutrition orientation and sociodemographic information. The analysis was based on a two-stage empirical survey that started with a qualitative phase and was followed by a quantitative survey (Stieß & Hayn, 2005).

Summarizing, the presented academic typologies focused on a specific topic within food-related behaviour such as e.g. sustainability, pleasure or obesity.

In contrast to the aforementioned commercial as well as academic food-related behaviour typologies, we pay special attention to food-related behaviour from the individual's point of view and aim to consider the multiple aspects of how people integrate eating into their everyday lives, while engaging with themselves and their environment. For this purpose, the idea of qualitative social research fits best, since it sheds light on the subject and on the in-depth understanding of its actions (Brinkmann & Kvale, 2015; Flick, 2017). The application of qualitative interviews was thus ideally suited for the purpose to build a typology.

However, as both research methods, qualitative and quantitative, have their justification and their individual advantages, which mutually benefit each other (Creswell, 2015; Schumann, 2018), we decided to apply a mixed methods design for the analysis of the previously built types. Using mixed methods involves collecting and integrating both qualitative and quantitative data to enable analysis of the strengths of both approaches (Creswell, 2015).

Therefore, as a first step, we focused in a previous study on how people integrated eating into their everyday lives while engaging with themselves and the environment, thus living out personality development and related socialisation (Hurrelmann & Bauer, 2015). The aim was to build types using type-building qualitative content analysis (Kuckartz, 2016) and following Spiekermann's (2004) definition of eating action ("Esshandeln", Spiekermann, 2004), which implies action as well as interpretations processes of self-thinking individuals. This enabled us to build seven *eating action types*. By that, we deepened the understanding of people's everyday actions in relation to eating.

In this article, following the first step, we apply quantitative research methods as a mixed-methods approach to the analysis of the seven *eating action types* using cross over analysis and a quantitative content analysis of communication. We aim to gain breadth and depth in understanding and corroboration (Johnson, Onwuegbuzie, & Turner, 2007) of the different types. Thus, the unique feature(s) of each type shall be determined and a better understanding of the various food-related behaviours shall be created. By means of statistical analysis procedures, the special characteristics of the respective types can also be tested for their significance. This allows an even deeper insight into those aspects that play a special role for and in the integration of eating into everyday life by emphasising the differences in food-related behaviour of German consumers. Thus, the target of this study is to analyse how people integrate eating into their everyday lives, while engaging with themselves and their environment in Germany, using a mixed-methods approach.

This article is a first step towards generalising the results of the qualitatively built *eating action types*. It can be understood as a "precursor" to deriving a general typology that does not have a thematic focus, refers to the entire population and focuses on the individual. Furthermore, this study is the first food-related consumer segmentation study for Germany using a mixed-method approach what widens the methodological instrumental set in this field.

2. Methodology

2.1 Design Overview

In 2017, we conducted 42 semi-structured, problem-centred interviews in Bavaria, Germany. The interviews focused on how people integrated eating in their everyday lives from their personal point of view (Self-identifying citation, n.d.) and by that living out personality development and related socialisation (Hurrelmann & Bauer, 2015). In addition to the interviews, we collected quantitative data using a standardized questionnaire, in which participants were asked to state their gender, age and weight

All participants gave informed written consent and their participation was voluntary. The (Self-identifying Institution) data protection officer approved the data protection declaration and the documentation of the procedure. We followed the ethical principles of the Helsinki Declaration, the German Research Foundation (DFG) and the German Sociological Association (DGS).

The only criterion for inclusion in the study was a minimum age of 18 years, as parental consent would have been required for younger participants. The aim of the sampling was to obtain a relatively heterogeneous group in terms of the participants' age and gender. Ultimately, 37 interviews were selected for use in the analysis. The others were rejected (two incomplete worksheets, one case of unsuitable responses, one different nationality and one case of an eating disorder). Nevertheless, saturation was achieved, as no new subjects were identified in the interviews, as confirmed by the data analysis (Saunders et al., 2018). None of those invited to take part refused to participate in the interview. All participants were paid €15 for their assistance. The age range of the respondents was between 18 and 83 years. The study was carried out with 19 men and 18 women. Twenty-six people were of normal weight, eight were pre-obese and three were obese (WHO, 2019). All participants were born in Germany and had been socialized in Western European culture. Three participants were vegans (all female), another three were vegetarians (one male, two female) and the remaining 31 were omnivores.

To analyse the qualitative interviews, we employed content-structuring qualitative analysis as described by Kuckartz (2016) as a first analytical step. This form of analysis aims to identify topics and sub-topics and their systematization and conceptualization. We have worked with the deductive-inductive approach (Kuckartz, 2016), whereby following the guideline, existing (deductive) as well as new (inductive) thematic (close to the material) and analytical (conceptualizing, abstracting) cate-

ries were generated and identified (Kuckartz, 2016). We then performed type-building content analysis (Kuckartz, 2016). This procedure describes a methodological controlled analysis, at which a typology is the result of a grouping process, where a certain social condition is divided into types by means of one or more features. As a result, the elements of one type are as similar as possible (internal homogeneity), but as different as possible compared to other types (external heterogeneity) (Kluge & Kelle, 2010; Kuckartz, 2016). To build the typology, we worked as a team. The aim was to build polythetic types, meaning that the cases that belong to one type are as similar as possible but must not be identical (Kuckartz, 2016). The results were real types (Kuckartz, 2006) and represent the following seven *eating action types* (described in detail in Self-identifying citation (n.d.)): *Eating as a way of life*, *The Relaxed*, *Eating as self-determination*, *Eating as a necessary Evil*, *The Adaptive*, *The Overstrained* and *The Controlled*.

[Insert Table 1 about here.]

2.2 Quantitative content analysis and cross-over analysis

For the purpose of this study, we conducted a quantitative content analysis with the interviews in a second step, since it is 'a research technique for the systematic, objective, and quantitative description of the manifest content of communication' (Berelson, 1952). Thus it can be used to describe the surface content of communication (Rourke & Anderson, 2004). The benefit of this approach is that it gives an insight into the factors that influence individuals in the seven *eating action types* without having to enquire directly about personal food-related issues and thus run the risk of receiving answers based on the principle of social desirability (Köster, 2009).

We also analysed the *eating action types* using cross-over analysis to gain a deeper insight of both the essential similarities and differences (Prahl & Setzwein, 1999) between the types in terms of their unique features. We applied cross-over analysis based on the quantification of the qualitative variables resulting from qualitative content analysis. This approach is defined as the procedure in which at least one analysis type of one tradition (qualitative/quantitative data) is applied in order to analyse the data of the other tradition (Onwuegbuzie & Combs, 2010). It is therefore an inter-paradigmatic analysis (Vogl, 2017). Cross-over analysis is especially useful for analysing complementarity and elucidating (in-)consistencies (Greene, Caracelli, & Graham, 1989; Li, Marquart, & Zercher, 2000). It is understood in terms of convergent design, which collects and analyses quantitative and qualitative data at similar points in time and is followed by integrated analysis (Creswell, 2015). We

focused on data transformation as an analysis strategy for complementarity. Data transformation is the conversion of one type of data into another (Caracelli & Greene, 1993). Interpretability is best enhanced when the methods are implemented simultaneously and interactively within a single study (Greene et al., 1989). Our analysis mainly collected qualitative data, some of which was converted into quantitative data ('quantitizing') (Tashakkori & Teddlie, 2010) in order to detect regularities and unique features in the qualitative data that would otherwise not be recognizable or communicable (Sandelowski, Voils, & Knafl, 2009). Next, the data was analysed and integrated. The aim was to corroborate the results ('corroboration'), to obtain complementary information on phenomena ('complementarity') and to expand the information spectrum ('completeness') (Flick, 2004; Seipel & Rieker, 2003).

For a detailed overview of the study design applied, please see Figure 1.

[Insert Figure 1 about here.]

2.3 Analysis Methods

As a basis for our quantitative content analysis, we created a 'go list' that contained and considered only meaningful words and excluded meaningless words (e.g. definite and indefinite articles, numerical words, etc.). Next, we developed a dictionary based on the words included, using a special function of the MAXQDA (Verbi GmbH, 2020) software, to create groups of words similar in content and to develop categories by assigning descriptive names to each group. Based on this category system, a **quantitative content analysis** was performed. In this process, we used the list of references from the respective text passage in the interview and checked whether the statements made by the participants actually reflected the category counted. This procedure was repeated several times until the quantitative content analysis based on the dictionary no longer gave misleading results.

Initially, our dictionary contained 13 categories. However, we excluded four categories, because they contained too few words compared to the other categories. Thus, all categories contain a minimum of seven words. If a word belonging to a certain category was mentioned several times in a single sentence, we only counted that category once.

In addition, we performed a **cross tab** analysis of the *eating action types* and the categories that evolved in the course of the qualitative content analysis. We complemented and checked the results of the cross tab by evaluating the **point biserial correlation** using SPSS (IBM, 2020). We quantified the main categories and subcategories of the qualitative content analysis by transforming them into

numeric variables (number of mentions) using MAXQDA. The point biserial correlation is particularly suited to the analysis of relationships between an interval-scaled variable (number of counts of the categories) and a dichotomous variable (*eating action type*) (Cohen, Cohen, West, & Aiken, 2003).

3. Results

This section presents the main findings of the analysis in the form of a single paragraph summary for each *eating action type*. It begins in Table 2 with the socio-demographic distribution both within each type and in comparison with the other types.

[Insert Table 2 about here.]

[Insert Table 3 about here.]

[Insert Table 4 about here.]

[Insert Table 5 about here.]

[Insert Table 6 about here.]

Table 3 shows the results of the quantitative content analysis for each *eating action type*. However, it should be noted that an apparently identical content can have quite different origins and consequences.

In order to determine the unique features of each *eating action type*, we have listed the important qualitative categories identified for each of the respective types in Table 4. However, behaviour can vary among individuals of the same type. Thus, the qualitative categories in Table 4 do not necessarily apply to every individual to the same extent.

In order to analyse which qualitative categories are able to withstand statistical calculation and are significant for each type, we have calculated the point biserial correlations, which are shown in Table 5.

Finally, we have combined the results of our study in Table 6. In the following, we will go into more detail about the findings shown in Table 6. Above all, this table shows how the individual *eating action types* are reflected in actual unique features.

Eating as a way of life

This type is represented by two women and one man. All three are of regular weight. It is the *eating action type* with the second-lowest age, with an average of 42.3 years.

Eating as a way of life is characterised by a unified and life-influencing nutritional idea. Thus, the lifestyle, which implies an idea of an ideal diet, is oriented towards one's own demands and

needs, i.e. living in harmony with nature, the body and the mind. The 'body reference' (n = 18) therefore illustrates a strong need for body awareness, because the satisfaction of one's own demands and needs and thus the communication of a positive body awareness underlines the perceived positive effects of the idea of an ideal diet. 'Subjectivization' (n = 10) takes the form of repeatedly relating one's own more radical lifestyle to that of others, along with the consequences and difficulties that go along with this. By gathering information, these people have adapted their behaviour towards an idea of an ideal nutrition ($r = .905, p < .001$). The main reason for the behavioural change is the belief in natural physical needs (living in harmony with nature) ($r = .713, p < .001$), which is an integral factor of the diet. The concept enables individuals of this type to reward themselves ($r = .512, p < .001$), because, among other things, they repeatedly have to manage their own claims towards others ($r = .635, p < .001$), which underlines the importance of subjectivization by making constant reference to them ($r = .442, p < .01$).

The Relaxed

The Relaxed is represented by three men and four women, with an average age of 42.9 years. Five are of normal weight, one is overweight and one is obese. *The Relaxed* is characterized by a distinctly casual attitude to food. At the same time, emphasis is also placed on the person's own wellbeing. The quantitative content analysis identifies 'body references' (n = 16) as a main topic, revealing that this type considers physical wellbeing to be important. Thus, *The Relaxed* makes reference to the body to underline the importance of eating a full and healthy diet. The second most frequent content is 'community' (n = 15). For this type, 'community' is important because of the benefits and positive associations of eating with other people and the way their eating behaviour and meal requirements are affected in the presence of others. Their unique and decisive feature is their relaxed attitude towards food and their own diet ($r = .565, p < .001$) along with a desire to feel replete after eating ($r = .416, p < .05$).

Eating as self-determination

Two men and five women represent this type. With an average age of 38.7 years, it is the youngest group of *eating action types*. Only one individual of this type is overweight, while the others are of normal weight.

This type is strongly focused on itself in terms of independence from others. The feeling of being dependent is considered stressful by this type. The 'intended behaviour' (n = 21) is one of the

issues that *Eating as self-determination* often refers to, which emphasizes the endeavour to use fresh food, to prepare meals according to one's needs and to consume in a moderate, regular and healthy way. The behaviour therefore refers to the use, preparation and consumption of food. The intended behaviour again underlines the other aspect, the need to be independent of others. *Eating as self-determination* thus refers to 'community' (n = 18) to underline his or her own distinctiveness from other people. The personal attitude towards food is then clear: the individuals in this type set themselves apart from and compare themselves with others, and the behaviour of others is reflected on and evaluated. Since a self-determined daily structure is of central importance ($r = .495$, $p < .01$), this category is not mentioned by any other type: The examination of society serves to delimit and emphasize the self and its needs, as does the development of one's own structures and the abandoning of behaviours learned from parents ($r = .415$, $p < .05$).

Eating as a necessary Evil

Two women and one man are the representatives of this type, which is the oldest of all the *eating action types* with an average age of 81.7 years. Two of the individuals are overweight and one is of normal weight.

For this type, neither eating itself nor any other food-related behaviour plays any relevant role; eating is considered to have no meaning or value. The main finding of the content analysis was found during the interviews to be 'habits' (n = 5). This underlines the routines that characterize food-related behaviour, indicating the insignificance of food and eating. The same established and familiar behaviours shape this type's food-related behaviour, indicating an unwillingness to address the topic more intensively. The fact that this type rarely cooks is also fitting ($r = .498$, $p < .01$).

The Adaptive

Four men and one woman represent this *eating action type*. The average age of this type is 55.4 years; three are of normal weight, one person is overweight and one is obese.

The *Adaptive* type is mainly characterized by a tendency to adapt to others. This is underlined by the results of the quantitative content analysis, which shows the importance of the community for providing a food-related behaviour; 'community' (n = 9) is therefore the main topic of this type. *The Adaptive* makes reference to 'community', indicating that social interaction plays a significant role. Food and eating is understood as an essential aspect of family and social life ($r = .587$, $p < .001$). This fact is always in the foreground when it comes to eating and leads to a situational adapta-

tion of the type's own food-related behaviour to that of others ($r = .470, p < .01$). A noteworthy aspect is the frequent use of *us* or *we*, which underpins the adaptation to others. A further important issue is 'habits' ($n = 7$), which indicate a partly shared standardized behaviour. *The Adaptive* refers to this content by emphasizing family meal rituals.

The Overstrained

Six men and two women, with an average age of 53.8 years, represent *The Overstrained*. Five people of this type have normal weight, two are overweight and one is obese.

The Overstrained is characterized by a failure to implement a consistent positive attitude towards food. Thus, this type makes repeated 'body references' ($n = 20$) due to the negative impact of their inconsistent and stressful behaviour on the body. However, these references differ greatly due to the individual's failure to meet existing demands (e.g. having no physical limitations despite having a high weight, a lack of self-respect for the body, a desire to stay fit, an unwanted feeling of fullness). The 'intended behaviour' ($n = 17$) stands for all the attempts that are made in the mind to change the situation. Significantly, these attempts tend to remain in the mind, and no actual changes occur. People of this type are aware of what they should (and should not) be doing, but for various reasons, they do not do it, which then leads to overstraining ($r = .579, p < .001$). In general, this leads to a negative affect towards eating day(s) ($r = .634, p < .001$). This in turn leads to using food as a distraction ($r = .483, p < .01$), followed by a guilty conscience ($r = .367, p < .05$), which also results from an inability to change the situation.

The Controlled

This type is represented by two men and two women. The average age is 45.8 years, and three individuals are of normal weight, while one is overweight.

The *Controlled* type is characterized by a highly controlled behaviour. The emphasis is on the body, which is required to meet the person's own high standards. The results of the quantitative content analysis revealed 'body reference' ($n = 20$) as the main issue for this type. For *The Controlled*, the all-influencing importance of low body weight is emphasized, leading to generally controlling behaviour. Thus, 'control behaviour' ($n = 16$) stands here for the constant need to meet one's own physical demands. To achieve this, the abandonment of certain foods or meals is an acceptable price ($r = .585, p < .001$). Body image is of particular importance, weakened or strengthened by comparisons with others ($r = .424, p < .01$). This constant preoccupation with one's own body leads to balanc-

ing previous and present consumption and weighing up present consumption with what has already been consumed and what may still be consumed ($r = .464, p < .01$). Although this behaviour is very restrictive, it is not considered to be an eating disorder, because people of this type repeatedly allow themselves exceptions to the controlled behaviour ($r = .513, p < .001$).

4. Discussion and conclusions

The purpose of this paper was to analyse more deeply the previously built *eating action types* by bringing their decisive features more into focus. To do this, we applied quantitative analysis of qualitative data. The combination of both approaches brings each of their respective strengths to the fore (Creswell, 2015; Schumann, 2018). In this way, we were able to derive the specifics embedded in the *eating action types* to emphasise further those aspects that play a special role for people in integrating eating into everyday life while engaging with themselves and their environment.

4.1 Methodological considerations

Quantitative analysis of the qualitative data enables an enhanced distinction between individual *eating action types* and pinpoints their particular distinguishing features, giving us a detailed insight into the characteristics of the types. This article shows that quantitative analysis techniques can also be used with small case numbers and can contribute to a general understanding of the thematic content. This indicates the benefit of the cross-over analysis as the cross tab stressed special characteristics and the results of the point biserial correlation underline significant unique features of these special characteristics. The result is an increased and more focused differentiation between the *eating action types* that give a clear insight into how people integrate eating into everyday lives while engaging with themselves and the environment.

The limitations of the methods used in this project are due to the small number of cases. Thus, it is not possible to describe this as a representative study. The results of the study should be tested to ascertain their significance for a representative cross section of the population.

It would also be interesting to determine to what extent our approach and the corresponding results can be transferred to other areas of consumption. This would serve to test and verify our design. Additionally, after repeated testing, our approach could serve as the basis for developing an instrument that can identify different types in differing areas of consumption.

Furthermore, the development of a dictionary requires a lot of manual effort, since MAXQDA cannot evaluate content logic. Accordingly, each assignment requires human verification, which is very time-consuming and error-prone. Evaluation by a scientist is a subjective process. On grounds of capacity, only one scientist, the first author, reviewed the text passages assigned to the respective categories. Thus, it cannot be excluded that this also influenced the results of this study.

Since this study was conducted in one particular region of Germany (Bavaria), it is necessary to investigate whether the *eating action types* identified can be verified for the whole area of Germany.

Since food and nutrition behaviour differ in different nations and cultures, another questions concerns what changes might occur if the approach were to be transferred to other countries or cultural areas.

4.2 Discussion of factual findings

As a result of changes in society and the multiple options that are now available, eating culture has become more heterogeneous in Germany (Hayn, 2008; Nestlé Deutschland AG, 2019). Our study confirms these findings by highlighting the peculiarity of each *eating action type* to determine the unique features of each individual *eating action type*. Nitzko and Spiller (2014) revealed that pleasure orientation, slimness and wellbeing, and health and diversity are essential factors that influence food-related behaviour. All of these aspects can be found in our types: pleasure orientation is an important aspect for *The Relaxed*, slimness is of high relevance for *The Controlled*, wellbeing is significant for every *eating action type*, and health is especially important for *Eating as a way of life*, whereas diversity is represented by the different types.

A detailed comparison of the findings of this study with previous segmentation studies in Germany is restricted by differences in the studies' foci. Our study focuses on the *eating action* question of how people integrate eating into everyday lives, while other studies mainly focus on the food itself, e.g. the question of what is eaten (Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Nestlé Deutschland AG, 2021) or have special thematic foci (Bruhn, 2008; Brunsø et al., 1996; Kluß, 2018; Stieß & Hayn, 2005). Thus, we highlight findings of this study that are comparable with each other.

With regard to the Nestlé Nutrition Types (Nestlé Deutschland AG, 2021) we find that *Eating as a way of life* is comparable with *The health idealists* ("Gesundheitsidealisten", Nestlé Deutschland AG, 2021) in the sense that they predominantly comprise ecologically conscious women who wish to live

in harmony with nature, adapting their current lifestyle by obtaining new information (Nestlé Deutschland AG, 2021). We did not find a comparison group for *The Relaxed*. The Nestlé nutrition study also includes a *Modern Multi-Optional* type (“Die modernen Multi-Optionalen”, Nestlé Deutschland AG, 2021) which can be compared with *Eating as self-determination*. Both groups have in common that they are relatively young, with ages of 26-55 and live in a dichotomy between their own high demands and a tight time budget. *The dispassionate pragmatists* (“Die leidenschaftslosen Pragmatiker”, Nestlé Deutschland AG, 2021) can be compared with *Eating as a necessary Evil*. Similarities can be found in the age structure, the level of sophistication, and the satisfaction with the status quo. Food intake in this group is simply seen as a means to an end, but there are fixed dietary rituals and emphasis is placed on regular meals. Characteristics such as those that we found in the *Adaptive* type can also be seen in *The Nest Warmers* (“Nestwärmer”, Nestlé Deutschland AG, 2021). This group covers all age groups. Here, family and tradition are very important, harmony is strived for and joint meals with family and friends are very important.

Interestingly, *The Overstrained* is not found as an independent group in any other nutritional typology (Bruhn, 2008; Brunsø et al., 1996; Czinkota, 2017; G+J Media Sales, 2012; GfK, 2015; Kluß, 2018; Nestlé Deutschland AG, 2021; Stieß & Hayn, 2005). Only some types mentioning inner conflicts and ambivalences are identified in previous studies. However, these types do not have a general character, but are concerned with partial aspects (Stieß & Hayn, 2005). However, *The Overstrained* is actually the largest group in our study, with a total of eight persons. Hayn (2008) and Jastran, Bisogni, Sobal, Blake, and Devine (2009) refer to the fact that once established, everyday actions are not constantly reflected upon because they reduce complexity, offer strong relief potential and provide stability and security *'because life runs more smoothly when things become predictable and expected from day to day and week to week.'* (Jastran et al., 2009). However, these everyday actions have to be actively constructed, stabilised, maintained and changed by each individual (Hayn, 2008). With regard to *The Overstrained*, the results of our study suggest that many people fail to implement actively everyday food-related behaviour due to internal or external changes that are actively affecting them and that lead to non-well-being due to implicit motives that are not congruent with their external motives (Job, Oerting, Brandstätter, & Allemand, 2010; Lampmann, Emberger-Klein, & Menrad, 2021). However, this motive incongruence cannot be revealed by examining food-related behaviour only with a standardized questionnaire. Rather, standardized questionnaires describe how

people actually behave; but it is hard to determine by means of closed questions whether behind the behaviour described lies a (great) overstraining. Only through the combination of qualitative and quantitative research methods, it was possible, on the one hand, to identify the group of *The Overstrained* qualitatively and, on the other hand, to confirm and emphasise it through statistical analysis. Otherwise, overstraining in the context of food-related behaviour is only taken into account by studies focusing on people with specific eating disorders (anorexia, bulimia, etc.) (Kathrein, 2019). However, as our study suggests, there are people with a healthy mental attitude to food who nevertheless feel overstrained. Moreover, the absolute number of overweight and obese people is highest in *The Overstrained* group. Taking the definition of the WHO, 37.5% of people of *The Overstrained* weigh too much (WHO, 2019). Bruhn (2008) shows that social changes and changes in the environment are the main reasons for the rapid increase in overweight and obesity (Bruhn, 2008). Only *Eating as a necessary Evil* and *The Adaptive* show higher rates of overweight and obesity. However, *Eating as a necessary Evil* is the oldest *eating action type*, and weight gain in old age is due to changes in a person's metabolism and energy requirements (Herzner, 2016).

The Controlled can best be compared with the *Fitness-oriented and ambitious* type ("Die fitnessorientierten Ambitionierten", Stieß & Hayn, 2005) of the study by Stieß and Hayn (2005). This type is characterized, among other things, by an effort to maintain high levels of performance and fitness and to keep the body attractive through controlled eating. Individual success is measured primarily in terms of the perception of others, which is why some people attach so much importance to their own appearance (Stieß & Hayn, 2005).

Another interesting aspect is that of the sense of community created by eating together. Joint meals are of great importance to many people, even though the community-building role of eating is actually becoming less important (Nestlé Deutschland AG, 2019). Our study confirms both findings, as eating together is indeed of great importance to many of our participants, while some struggle with the food-related behaviour of other people, placing the focus on their own food-related behaviour (*Eating as a way of life, The Relaxed, Eating as self-determination* and *The Controlled*). For *Eating as a necessary Evil*, eating as such does not play a relevant role, therefore nor does eating together.

With this study, we have shown that quantitative analysis of the qualitative data was able to identify an improved distinction between the individual eating action types and show their particular distinguishing features, giving us a detailed insight into the characteristics of each type. As a major

result, we did not find a comparison group for *The Relaxed*, nor for *The Overstrained* in previous literature. Interestingly, these two are the groups that seem to be the most opposed to each other that have so far received little attention in terms of their extent as a single group. The result of *The Overstrained* as a distinct group deserves special emphasis. This group does not suffer from a mental eating disorder; rather they would like to know a relaxed way of integrating food into their everyday life. Yet they fail and often suffer from obesity. The desire to find a sensible way to integrate eating into everyday life should be taken into account for people of this type by nutritional counselling, policies and advertisers.

In this study, we were able to show the main content of each type when it comes to eating. It was shown that an idea of an ideal nutrition leading to physically and ethically well-being, having a relaxed attitude towards eating, self-determination, the body as an instrument of control, adaptation and overstraining play relevant roles when it comes to how people integrate eating into their everyday life and thus experience personality development and related socialisation. In the group comparison, it became clear that the reference to the body occurs repeatedly, although the reference can have different origins, e.g. the need to feel good physically, or the need to maintain control over the body or to live in harmony with nature. In addition, the reference to the "community" is increasingly established, but here too from different perspectives, either because the presence of others is stressful or relaxing. The need for subjectivization and for control is unique: these two contents can be found in only one type each and thus distinguish them in particular. The cross-over analysis, in turn, confirms the results of the qualitative built types and underpins the respective *eating action types* in their characteristics, with which they distinguish themselves from each other.

Thus, in this study, we have shown what methods are applied individually when it comes to how people integrate eating into their everyday lives and thus experience personality development and related socialisation. With this study, we have taken a first step towards generalising the results of the qualitatively built *eating action types*. It can be understood as a preliminary step towards deriving a general typology that does not have a thematic focus, refers to the population as a whole and focuses on the individual. However, the results should be further explored in qualitative and quantitative studies in future in an international context to show whether there are e.g. cultural influences or differences between countries. Furthermore, this study is the first food-related consumer segmentation study for Germany that uses a mixed-methods approach, which expands the methodological

toolkit in this field. The results of this study are valuable for nutrition consultancies, food companies, politicians and advisers in order to consider people's differing ways how to integrate eating in their daily lives in their specific activities. This might improve business success of commercial companies, but also enhance effectiveness of political initiatives and advice and education activities in the field of nutrition and eating.

Declaration of Competing Interests

The authors declare that they have no competing interests.

Author Contributions

The first author conceived, designed and performed the experiments; the first author analysed the data and wrote the draft of the paper. All other authors contributed to the writing and evaluation process.

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Ethical Approval

Ethical approval was not required because no questionable (medical or morally reprehensible) research was conducted on the participants of this study. In addition, the data protection officer of (self-identifying name of the university) has approved the data protection declaration and the documentation of the procedure.

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Appendix 11: Tables & Figure of Publication IV

Table 1 Overview of the contents of the seven eating action types (Self-identifying citation, n.d.)

EATING ACTION TYPE	SHORT DESCRIPTION OF EATING ACTION	ESSENTIAL QUOTE	POSSIBLE EXPLANATION
EATING AS A WAY OF LIFE (N = 3)	Characterised by a uniform food concept, such as veganism or a diet based mainly on (wild) herbs. These concepts steer one's own nutritional behaviour in a certain direction, which is determined by self-imposed rules and demands out of conviction and which have an impact on the general lifestyle; however, the chosen concept remains entirely endorsed.	<i>So the last few years I have been VERY busy with it, but I am now putting this knowledge into practice. That's why I don't read so much in books anymore, because I have the knowledge now and integrate it into my everyday life or shopping.</i>	Spiritualising food and the body through alternative eating. Thus, victory of the mind over the body (Klotter, 2016).
THE RELAXED (N = 7)	Characterised by a conscious and relaxed relationship with their own food-related behaviour and the ideas implied. The implementation of the ideas works without effort. Food is strongly associated with positive emotions such as pleasure, joy and anticipation.	<i>I feel good and comfortable with [the meal], firstly because I know that I enjoyed it, secondly because I had time, that I could enjoy it, that I wasn't under any time pressure and thirdly because I believe that I also fed myself well and correctly and varied.</i>	Dijker (2019) explains the ability of a moderate eating style, which is characterised by perception, consciousness and motivation, representing elements that can all be found in this type.
EATING AS SELF-DETERMINATION (N = 7)	Nutrition is given a high priority, as it is understood as a means of implementing and satisfying one's own needs. The self is at the centre of attention and the own needs and demands receive special attention. The need to be free in one's own decisions is high. However, this type does not follow a unified concept such as veganism, but develops its own food concepts, which in particular include the demand for healthy eating.	<i>But I still always look forward to my salad for lunch. [...] especially because I know that it is homemade and because I know what's in it. Well, that is also important for me. I feel much better when I eat my salad than a meatloaf bread roll I bought at work.</i>	In self-determination theory (SDT), action can be taken according to autonomous motivation (Deci & Ryan, 1985, 2000), whereby food-related behaviour is understood as an opportunity for self-determination and the associated well-being (Deci & Ryan, 1985, 2000).
EATING AS NECESSARY EVIL (N = 3)	Food and everything that belongs to it is of little importance. It is rather understood as something necessary for life. Therefore, little thought is given to food, eating and the behaviour associated with it.	<i>So [eating] is necessary for the preservation of life, but there is no fun in it. I cannot say.</i>	Age plays an important role here, as age brings with it an increased risk of a lack of social interaction, which is particularly evident during meals (Cappelletti et al., 2010). This can lead to loneliness. For this reason, these people attach particular importance to their remaining social relationships and rate food as secondary.
THE ADAPTIVE (N = 5)	Adaptation to others is the characteristic feature of this type. Therefore, the food-related behaviour is not implemented independently. Rather, they wait for others to become active in	<i>Okay, and that's where I adapt. [...] on week-ends [...] the only son who still lives in [...] comes with his wife and one of my grandchild-</i>	According to Chernyakova (2014), the preservation of identity in the course of adaptation, the perception of adaptation as a desired action and the existence of appropriate circumstances that enable the subject to make the

	terms of food and they just have to join in. Accordingly, eating together with other (close) people is of special attention.	<i>dren [...] and they bring, I pay, but they bring the food. Therefore, they determine [...].</i>	necessary changes are essential aspects of social and successful adaptation. Accordingly, adaptation reflects behaviour that goes along with well-being while preserving one's own identity.
THE OVERSTRAINED (N = 8)	Characterised by overstraining with food. Overstraining results either from personal overload or from external circumstances such as unemployment or illness. Individuals debate with themselves what and how to do things properly, but do not reach a good solution. This leads to behaviour patterns, which they do not feel comfortable with and which further unsettle them.	<i>And sometimes it's stress because when I can't decide what I want, it stresses me. Especially before shopping, because I always think about what I have to buy or what I want to buy and that's a mixture of I'm actually happy that I can buy everything I want, because I don't have anything at home and on the other hand it's like: buy the RIGHT one too.</i>	It can be assumed that the overstraining is influenced by a discrepancy between implicit and explicit motives. Job et al. (2010) showed that motivational discrepancy is related to emotional distress, while emotional distress is (partly) responsible for the connection between motivational discrepancy and food-related behaviour. People with motivational discrepancy eat more and prefer unhealthy, tasty food because they want to downregulate the emotional stress caused by the motivational discrepancy (Job et al., 2010). <i>The Overstrained</i> repeatedly emphasised the discrepancy between internal values, ideas and wishes and external circumstances and demands.
THE CONTROLLED (N = 4)	Characteristic for this type is the compulsion to keep control over one's own body. This strong need is seen as a unique and particularly characteristic feature of this type, as it determines all food-related behaviour.	<i>But even if I'm hungry, I still don't eat. Because I always pay attention to my kilos. But I actually like doing it [eating] very much.</i>	Sociological theories of action assume that the body is a controllable instrument that is subject to the will of man (Klein, 2010; Lane, 2017). Body modifications are associated with success, because athletic bodies represent positively connoted social norms such as performance, endurance and strength (Klein, 2010).

Table 2 Typology table - sociodemographic characteristics, weight and nutrition of *eating action types*

Variable	Eating as a way of life (N = 3)	Relaxed (N = 7)	Eating as a way of self- determination (N = 7)	Eating as a necessary evil (N = 3)	Adaptive (N = 5)	Overstrained (N = 8)	Controlled (N = 4)
Gender: female, number (%)	2 (66.7)	4 (57.1)	5 (71.4)	2 (66.7)	1 (20.0)	2 (25.0)	2 (50.0)
Gender: male, number (%)	1 (33.3)	3 (42.9)	2 (28.6)	1 (33.3)	4 (80.0)	6 (75.0)	2 (50.0)
Age, mean value (standard deviation)	42.3 (18.4)	42.9 (24.0)	38.7 (23.3)	81.7 (1.2)	55.4 (22.4)	53.8 (20.9)	45.8 (14.0)
Obese, number (%)	0	1 (14.3)	0	0	1 (20.0)	1 (12.5)	0
Overweight, number (%)	0	1 (14.3)	1 (14.3)	2 (66.7)	1 (20.0)	2 (25.0)	1 (25.0)
Regular Weight, number (%)	3 (100.0)	5 (71.4)	6 (85.7)	1 (33.3)	3 (60.0)	5 (62.5)	3 (75.0)
N = Number of individuals of the total sample	3 (8.1%)	7 (18.9%)	7 (18.9%)	3 (8.1%)	5 (13.5%)	8 (21.6%)	4 (10.8%)

Table 3 Results of the quantitative content analysis based on categories

Dimension	Eating as a way of life (N = 3)	The Relaxed (N = 7)	Eating as self- determination (N = 7)	Eating as a neces- sary evil (N = 3)	The Adaptive (N = 5)	The Overstrained (N = 8)	The Controlled (N = 4)
Most frequent content	Body reference (18)*	Body reference (16)	Intended behaviour (21)	Habits (5)	Community (9)	Body reference (20)	Body reference (20)
Second-most frequent content	Subjectivization (10)	Community (15)	Community (18)		Habits (7)	Intended behaviour (17)	Control behaviour (16)

*Number in brackets: counted citations

Table 4 Cross table for selected categories based on qualitative content analysis: percentage of number N = individuals

Category	Eating as a way of life (N = 3)	The Relaxed (N = 7)	Eating as self-determination (N = 7)	Eating as a necessary evil (N = 3)	The Adaptive (N = 5)	The Overstrained (N = 8)	The Controlled (N = 4)
Behavioural change by gathering of information	100.00	0.00	0.00	0.00	0.00	0.00	25.00
Dealing with own demands	66.67	0.00	0.00	0.00	0.00	25.00	0.00
Rewarding	66.67	14.29	14.29	0.00	0.00	25.00	0.00
Relating to others	100.00	0.00	28.57	0.00	0.00	25.00	50.00
Belief in natural physical needs	66.67	14.29	14.29	0.00	0.00	0.00	100.00
Reasoning of own consumption behaviour	66.67	28.57	57.14	0.00	0.00	75.00	75.00
View of society	100.00	14.29	42.86	0.00	60.00	50.00	50.00
Conscious food intake	66.67	57.14	42.86	0.00	20.00	37.50	50.00
Good conscience	100.00	57.14	42.86	0.00	20.00	25.00	25.00
Positive affect	33.33	100.00	42.86	66.67	60.00	25.00	50.00
Justification	0.00	57.14	14.29	33.33	20.00	12.50	25.00
Importance of being satisfied	0.00	28.57	0.00	0.00	40.00	0.00	0.00
Self-determined daily structure	0.00	0.00	28.57	0.00	0.00	0.00	0.00
Development of own structures	0.00	0.00	42.86	0.00	20.00	12.50	0.00
Homemade	33.33	28.57	57.14	0.00	20.00	50.00	50.00
Rarely cooks	33.33	0.00	14.29	100.00	20.00	25.00	25.00
Weight control	0.00	28.57	28.57	66.67	40.00	75.00	75.00
Development of own individual health concept	66.67	57.14	42.86	33.33	60.00	50.00	25.00
Adaptation to others	33.33	14.29	14.29	0.00	60.00	12.50	0.00
Important part of family life	0.00	42.86	14.29	0.00	80.00	12.50	0.00
Overstraining	33.33	14.29	28.57	0.00	0.00	62.50	25.00
Negative affect	0.00	0.00	28.57	0.00	0.00	75.00	25.00
Eating as a distraction	0.00	14.29	14.29	0.00	0.00	37.50	0.00
Guilty conscience	33.33	14.29	28.57	0.00	0.00	50.00	25.00
Balancing behaviour	0.00	14.29	0.00	0.00	40.00	12.50	100.00

Category	Eating as a way of life (N = 3)	The Relaxed (N = 7)	Eating as self- determination (N = 7)	Eating as a necessary evil (N = 3)	The Adaptive (N = 5)	The Overstrai- ned (N = 8)	The Controlled (N = 4)
Weighing process	0.00	28.57	28.57	0.00	0.00	25.00	75.00
Exceptions (from control behaviour)	0.00	14.29	28.57	0.00	0.00	0.00	50.00

Table 5 Point biserial correlation (Significances (2 sided)) (n = 37) of the *eating action types* with important categories found in the qualitative content analysis

Variable	Eating as a way of life (N = 3)	The Relaxed (N = 7)	Eating as self-determination (N = 7)	Eating as a necessary evil (N = 3)	The Adaptive (N = 5)	The Overstrained (N = 8)	The Controlled (N = 4)
Behavioural change by gathering of information	.905** (0.000)	-0.159 (0.349)	-0.159 (0.349)	-0.098 (0.566)	-0.130 (0.444)	-0.172 (0.307)	0.062 (0.716)
Dealing with own demands	.635** (0.000)	-0.132 (0.435)	-0.132 (0.435)	-0.081 (0.632)	-0.108 (0.524)	0.046 (0.786)	-0.095 (0.575)
Rewarding	.512** (0.001)	-0.077 (0.652)	-0.077 (0.652)	-0.114 (0.501)	-0.152 (0.369)	0.109 (0.519)	-0.134 (0.430)
Relating to others	.442** (0.006)	-.203 (.228)	-.090 (.596)	-.125 (.462)	-.166 (.326)	-.113 (.504)	.424** (.009)
Belief in natural physical needs	.713** (0.000)	-.105 (.538)	-.105 (.538)	-.111 (.512)	-.148 (.381)	-.197 (.243)	.159 (.346)
Reasoning of own consumption behaviour	.121 (.477)	-.162 (.338)	.121 (.476)	-.204 (.226)	-.272 (.104)	.285 (.087)	.046 (.786)
View of society	.257 (.125)	-.232 (.168)	.126 (.459)	-.162 (.337)	-.067 (.692)	.145 (.391)	-.068 (.691)
Conscious food intake	.053 (.755)	.029 (.864)	.029 (.864)	-.192 (.254)	-.125 (.460)	.148 (.382)	-.010 (.955)
Good conscience	.264 (.114)	.105 (.536)	.213 (.205)	-.201 (.232)	-.144 (.395)	-.150 (.375)	-.099 (.558)
Positive affect	-0.141 (0.407)	.565** (0.000)	-0.160 (0.346)	0.008 (0.962)	-0.029 (0.865)	-0.216 (0.200)	-0.078 (0.648)
Justification	.121 (.477)	-.162 (.338)	.121 (.476)	-.204 (.226)	-.272 (.104)	.285 (.087)	.046 (.786)
Importance of being satisfied	-0.086 (0.612)	.416* (0.010)	-0.140 (0.407)	-0.086 (0.612)	0.098 (0.565)	-0.153 (0.367)	-0.101 (0.551)
Self-determined daily structure	-0.071 (0.676)	-0.115 (0.496)	.495** (0.002)	-0.071 (0.676)	-0.094 (0.578)	-0.126 (0.459)	-0.083 (0.624)
Development of own structures	-0.117 (0.489)	-0.191 (0.258)	.415* (0.011)	-0.117 (0.489)	0.075 (0.659)	-0.016 (0.927)	-0.138 (0.417)
Homemade	.205 (.224)	.032 (.851)	.032 (.851)	-.194 (.249)	-.099 (.560)	-.013 (.941)	.036 (.834)
Rarely cooks	-0.028 (0.867)	-0.260 (0.120)	-0.077 (0.651)	.498** (0.002)	-0.003 (0.987)	-0.021 (0.901)	0.044 (0.797)
Weight control	-.213 (.205)	.020 (.907)	-.265 (.113)	.079 (.642)	-.144 (.396)	.243 (.147)	.264 (.115)
Development of own individual concept	-.003 (.986)	.180 (.287)	-.137 (.419)	-.117 (.492)	.056 (.740)	.045 (.792)	-.070 (.680)
Adaptation to others	0.138 (0.416)	-0.119 (0.483)	-0.025 (0.882)	-0.131 (0.441)	.470** (0.003)	-0.142 (0.402)	-0.153 (0.365)
Important part of family life	-0.148 (0.382)	0.053 (0.756)	-0.143 (0.400)	-0.148 (0.382)	.587** (0.000)	-0.075 (0.657)	-0.173 (0.305)
Overstraining	0.078 (0.647)	-0.182 (0.280)	-0.131 (0.440)	-0.144 (0.396)	-0.191 (0.257)	.579** (0.000)	-0.104 (0.542)
Negative affect	-0.160 (0.344)	-0.260 (0.120)	0.015 (0.930)	-0.160 (0.344)	-0.213 (0.205)	.634** (0.000)	-0.014 (0.934)
Eating as a distraction	-0.101 (0.551)	-0.078 (0.648)	-0.078 (0.648)	-0.101 (0.551)	-0.135 (0.427)	.483** (0.002)	-0.119 (0.485)
Guilty conscience	-.052 (.760)	-.107 (.529)	.094 (.579)	-.148 (.382)	-.197 (.242)	.376* (.022)	-.089 (.600)
Balancing behaviour	-0.138 (0.416)	0.072 (0.672)	-0.224 (0.183)	-0.138 (0.416)	0.043 (0.802)	-0.150 (0.377)	.585** (0.000)
Weighing process	-0.147 (0.386)	0.014 (0.936)	-0.070 (0.679)	-0.147 (0.386)	-0.195 (0.247)	0.061 (0.722)	.464** (0.004)

Variable	Eating as a way of life (N = 3)	The Relaxed (N = 7)	Eating as self-determination (N = 7)	Eating as a necessary evil (N = 3)	The Adaptive (N = 5)	The Overstrained (N = 8)	The Controlled (N = 4)
Exceptions (from control behaviour)	-0.080 (0.638)	-0.061 (0.719)	0.007 (0.965)	-0.080 (0.638)	-0.106 (0.531)	-0.141 (0.404)	.513 ** (0.001)

** The correlation is significant at the level of 0.01 (2-sided). * The correlation is significant at the level of 0.05 (2-sided).

Table 6 Joint presentation of qualitative and quantitative data

<i>Eating Action Type</i>	Distinctive features based on quantitative analysis of qualitative data
<i>Eating as a way of life</i>	<p>Main food-related contents: Body reference; subjectivization</p> <p>Significant unique features: Behavioural change by gathering information; Dealing with own demands; rewarding; relating to others; belief in natural physical needs</p>
<i>The Relaxed</i>	<p>Main food-related contents: Body reference; community</p> <p>Significant unique features: Positive affect towards eating day(s); importance of being satisfied</p>
<i>Eating as self-determination</i>	<p>Main food-related contents: Intended behaviour; community</p> <p>Significant unique features: Self-determined daily structure; development of own individual structures</p>
<i>Eating as a necessary evil</i>	<p>Main food-related content: Habits</p> <p>Significant unique features: Rarely cooks</p>
<i>The Adaptive</i>	<p>Main food-related contents: Community; habits</p> <p>Significant unique features: Adaptation to others; eating as an important part of family life</p>
<i>The Overstrained</i>	<p>Main food-related contents: Body reference; intended behaviour</p> <p>Significant unique features: Overstraining; negative affect towards eating day(s); eating as distraction; guilty conscience</p>
<i>The Controlled</i>	<p>Main food-related contents: Body reference; control behaviour</p> <p>Significant unique features: Relating to others; balancing behaviour; weighing process; exceptions (from control behaviour)</p>

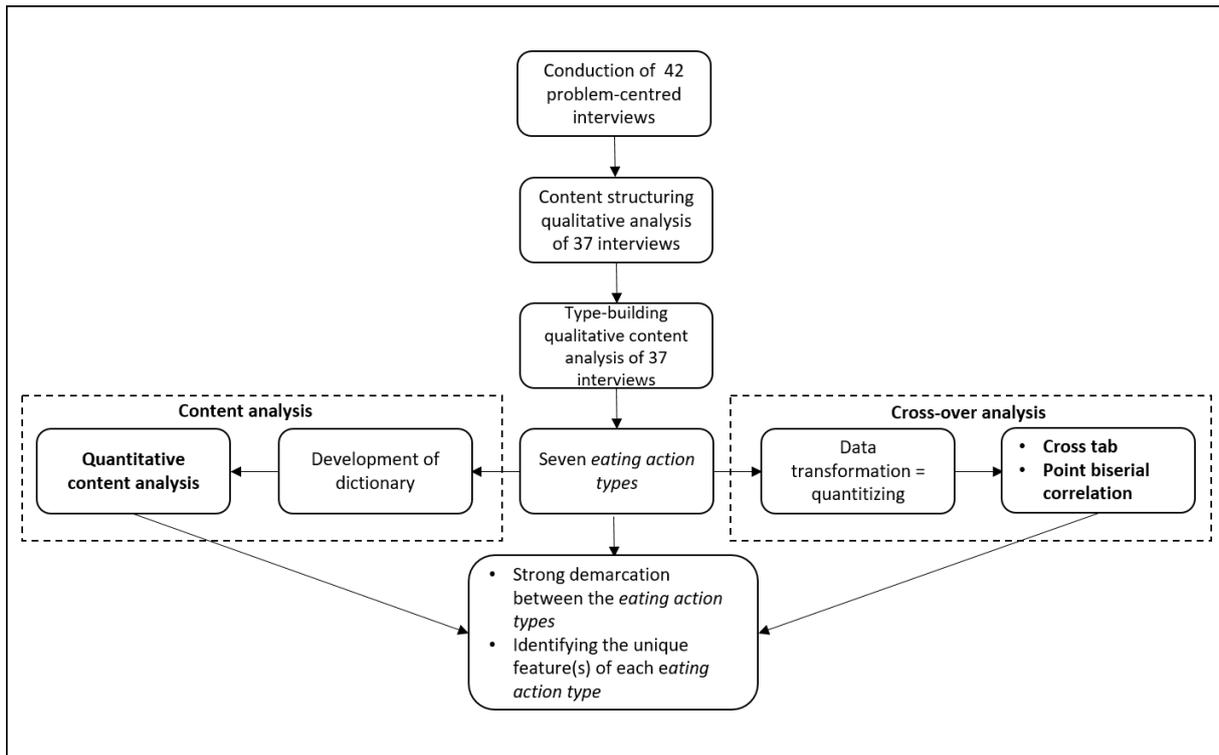


Figure 1 Overview of the study design